ASIAN INFRASTRUCTURE INVESTMENT BANK

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Project Document
of the Asian Infrastructure Investment Bank
Sovereign-backed Financing

People's Republic of China
Henan Flood Emergency Rehabilitation and Recovery Project

Currency Equivalents

(As of November 23, 2021)

Currency Unit – Chinese Yuan (CNY)
CNY1.00 = USD0.1564
USD1.00 = CNY6.3922

Borrower's Fiscal year
January 1 – December 31

Abbreviations

AIIB	Asian Infrastructure Investment Bank
CNY	Chinese Yuan
DRM	Disaster Risk Management
DRC	Development and Reform Commission
ES	Environmental and Social
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMPF	Environmental and Social Management Planning Framework
ESP	Environmental and Social Policy
ESS	Environment and Social Standard
etc.	Et cetera
FM	Financial Management
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GOH	Government of Henan
GPN	General Procurement Notice
GRM	Grievance Redress Mechanism
IPCC	Intergovernmental Panel on Climate Change
MDB	Multilateral Development Bank
MOF	Ministry of Finance
O&M	Operation and Maintenance
PDS	Project Delivery Strategy
PIM	Project Implementation Manual
PIR	Procurement Instructions for Recipients
PIU	Project Implementation Unit
PLG	Project Leadership Group
PMO	Project Management Office
PP	Procurement Plan
PPCG	Provincial Project Coordination Group
PPM	Project-affected People's Mechanism
PPMO	Provincial Project Management Office
PTL	Project Team Leader
RMF	Results Monitoring Framework
SPD	Standard Procurement Document
USD	United States Dollars
WB	World Bank

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1. Summary Sheet

Project No.	000543
Project Name	Henan Flood Emergency Rehabilitation and Recovery Project
AIIB Member	People's Republic of China
Borrower	People's Republic of China
Project Implementing Entity	Henan Province Zhengzhou Municipality Xinxiang Municipality Jiaozuo Municipality
Sector	Water
Sub-sector	Flood Protection
Project Objective	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.
Project Description	This project is an emergency operation in response to the urgent need of the Government of Henan Province for post-flood disaster recovery and reconstruction. The project will comprise activities in three municipalities of Zhengzhou, Xinxiang and Jiaozuo, which are among the most severely impacted by the flooding. Interventions will focus on rehabilitation and reconstruction of damaged infrastructure while the long-term sustainability and climate resilience are taken into account. The project will support post-disaster recovery in the sectors of water resources and flood management, urban, and transport, which are critical to social and economic recovery of the project municipalities and the province.
Implementation Period	Start Date: December 2021 End Date: December 2025
Expected Loan Closing Date	June 2026
Cost and Financing Plan	Project cost: USD1,399 million Financing Plan: AIIB loan: USD1,000 million Government of Zhengzhou Municipality, Government of Xinxiang Municipality and Government of Jiaozuo Municipality: USD399 million

Size and Terms of AIIB Loan	Loan Size: EUR 865 million[1] (approximately USD 1,000 million). Loan terms: final maturity of 35 years including a grace period of 5 years, at standard terms for AIIB sovereign-backed loans.
Cofinancing (Size and Terms)	N/A
Environmental and Social Category	A
Risk (Low/Medium/High)	High
Conditions of Effectiveness	1. Provincial Project Management Office (PPMO) staffed with professionals covering technical subjects including Financial Management, Procurement and Environmental and Social Management established before the loan effectiveness. 2. Project Implementation Manual (PIM) including procurement manual, financial management manual and Environment and Social Management Planning Framework developed and adopted before the loan effectiveness. 3. The Subsidiary Agreements have been duly executed on behalf of Henan Province, Zhengzhou Municipality, Xinxiang Municipality and Jiaozuo Municipality, under terms and conditions acceptable to the Bank
Key Covenants/Conditions for Disbursement	Conditions for Disbursement: The Project Management Information System has been procured and adopted, in form and substance satisfactory to AIIB. Key Covenant: For the sub-projects related to flood management, urban flood and drainage management, and flood emergency capacity development, for which feasibility studies or other materials are required under the laws and regulations of the Borrower, the Borrower shall cause the Project Implementing Entities to ensure, that prior to the formal submission of the feasibility studies or other required materials to the relevant government authorities for approval or clearance: a) the feasibility studies shall be reviewed by experts with qualifications as set forth in the Project Implementing Manual and to be assigned by the Project Implementing Entities; b) the Bank shall be afforded an opportunity to review

[1] The Loan amount is denominated in EUR with the exchange rate USD 1.0 = EUR 0.865 as of September 30, 2021. The costs and financing in this report, however, are presented in USD, when the project obtained the appraisal approval by the AIIB's Investment Committee.

	and provide additional comments within a reasonable period of time; and c) the Project Implementing Entities consider said comments by the Bank in their revision of such feasibility studies.
Retroactive Financing (Loan % and dates)	Retroactive financing of up to 20% of the loan for the eligible expenditures incurred and paid on or after July 20, 2021, and no more than 12 months prior to the expected date of signing of the loan agreement.
Policy Waivers Requested	N/A
Policy Assurance	The Vice President, Policy and Strategy, confirms an overall assurance that AIIB is in compliance with the policies applicable to the Project.
Economic Capital (Ecap) Consumption	USD9.51 million (ECap Ratio: 1.2%)

President	Jin Liqun
Vice President, IO Region 2	Konstantin Limitovskiy
Director General, INF2	Supee Teravaninthorn
Manager, INF2	Gregory Liu
Team Leader	Guoping Zhang, Senior Investment Operations Specialist - Water
Co-Team Leader	Jingjing Zhao, Investment Operations Specialist
Team Members	Somnath Basu, Principal Environmental and Social Development Specialist Chongwu Sun, Senior Environmental Consultant Yi Geng, Senior Financial Management Specialist Haiyan Wang, Senior Finance Officer Mengmeng He, Finance Associate Yunlong Liu, Senior Procurement Specialist Julius Thaler, Chief Counsel (SBF) Liu Yang, Counsel Nat Pinnoi, Senior Infrastructure Economist Woo-Hyun Kwon, Senior Investment Operations Specialist - Transport Yi Shi, Senior Urban Infrastructure Consultant Dongya Sun, Senior Flood Risk Management Consultant Shaojun Chen, Senior Social Consultant Siyang Wang, Project Assistant

2. Project Description

A. Project Overview

1. **Country Challenge**. China is prone to natural disasters, and flooding is the major disaster with a high frequency of occurrence, causing large scale economic losses and claiming human lives. Integrated flood risk management systems, including flood management legislation and regulations, flood control infrastructure and flood early warning systems for the major rivers, have been gradually established. However, challenges remain, particularly in the context of climate change. In the period between 2000 and 2019, China was the country most affected by flooding in the world, experiencing an average of 20 floods per year[2]. Over the period between 2000 and 2018, annual average direct economic losses due to flooding accounted for 0.5% of the annual average national Gross Domestic Product (GDP)[3]. In 2020, major floods in China resulted in a direct economic loss of USD36.6 billion[4].

2. **Vulnerability of Henan Province to flood disasters.** Situated in central China, Henan Province spans four largest river basins, namely the Yangtze River Basin, the Huaihe River Basin, the Yellow River Basin and the Haihe River Basin. With its unique geographical and hydrometeorological characteristics, Henan is one of the provinces most vulnerable to flood and drought risks in China. Of the 66 years from 1950 to 2015, flooding occurred in 32 years, with a less than 3-year recurrence interval, and in each of these years the flooded area in the province was greater than 667,000 hectares[5].

3. **Impact of the July 2021 flooding ("7.20 Flooding")**. In July 2021, heavy rainstorms struck Henan Province, especially Zhengzhou, the provincial capital, and the neighboring municipalities. From July 17 to 24, the cumulative maximum point rainfall reached 1074 mm, 1.4 times more than the annual average rainfall of the province. The hourly maximum rainfall of 201.9 mm broke historic records of precipitation in the land territory of China. The extreme weather events caused devastating flooding in Henan Province, affecting 14.5 million people in 150 cities and counties. Over 1 million hectares of cultivated lands were flooded, and houses belonging to more than 30,000 families collapsed. Nearly 1.5 million people were displaced or evacuated. The flooding claimed 302 human lives and 50 people remain missing. The flooding resulted in severe damages to infrastructure and other public assets, including urban and rural roads, bridges, water utilities, drainage systems, dikes, and dams. The direct economic losses were initially estimated by the Government of Henan (GOH) at around USD17.5 billion[6], almost 50% of the total direct economic losses of the entire country due to flooding in 2020. The municipalities most severely impacted by the 7.20 Flooding include Zhengzhou, Xinxiang and Jiaozuo.

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[2] Centre for Research on the Epidemiology of Disasters and the United Nations Office for Disaster Risk Reduction, 2020. The human cost of disasters: an overview of the last 20 years (2000 - 2019).
[3] Ministry of Water Resources, 2021. China Flood and Drought Disaster Prevention Bulletin - 2019.
[4] Ministry of Emergency Management, 2020. https://www.chinanews.com/gn/2021/01-02/9377255.shtml.
[5] Department of Water Resources, Henan Province. Floods and Droughts. http://slt.henan.gov.cn/2019/12-28/1175074.html.
[6] Government of Henan, 2021. The 10th Press Conference for Flood Control and Disaster Relief. August 2, 2021. https://www.henan.gov.cn/2021/08-02/2194036.html.

4. **Government Response.** At the onset of the 7.20 Flooding events, the Provincial Government of Henan (GOH) quickly activated an emergency response with immediate actions to rescue flood victims and provide disaster relief to communities and people affected by the flooding. To facilitate fast recovery and reconstruction, the central government has formed a special team to investigate and assess the flood disaster and damages and guide post-disaster planning. Under the guidance of the central government, GOH is preparing a master plan for post-flood disaster recovery and reconstruction of Henan Province ("Master Plan").

5. **AIIB's Support to the Government Response**. In response to the urgent need of the government for post-disaster recovery, AIIB proposed to provide an emergency loan to the Government to support the recovery efforts of the GOH. The scope of the proposed emergency project is in line with the GOH's Master Plan.

6. **Project Objectives.** The project objectives are to support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang, and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood risk management and flood emergency response.

7. **Project description.** The project responds to the GOH's urgent need for post-disaster recovery. As an emergency project, a framework approach is adopted for overall project design while a list of project activities consistent with the framework is proposed by the government based on the agreed sub-project selection criteria.

8. **The project framework.** The project will support post-disaster recovery in **three municipalities** of Zhengzhou, Xinxiang and Jiaozuo, which are among the municipalities most severely impacted by the flooding. Interventions will focus on rehabilitation and reconstruction of damaged infrastructure while long-term sustainability and climate resilience will be considered in the designs. The project will finance activities in **three sectors**, which are critical to social and economic recovery of the three municipalities, as well as the province. The three sectors are water resources and flood management, urban, and transport. The individual investment interventions, or sub-projects, selected during the preparation stage will be further screened and appraised during project implementation. A Project Implementation Manual (PIM), acceptable to AIIB, to guide the project implementation in all aspects, is being developed and will be adopted by each project municipality.

9. Climate change is leading to more frequent extreme events such as the 7.20 rainstorms, and consequently increasing the likelihood of severe flood disasters. It is therefore imperative to build in climate resilience in proposed investments and disaster risk reduction activities, and so too in this emergency project. Therefore, this project will be implemented in stages to achieve two goals: 1) to meet the urgent need for rehabilitation and reconstruction of the essential infrastructure required for quickly restoring social and economic activities; 2) to achieve the medium- and long-term sustainability of sub-projects by integrating short-term solutions with improved technical standards and long-term solutions with holistic designs.

10. The prioritized project activities include: 1) water and flood management interventions such as river dredging, dike rehabilitation and strengthening; 2) urban infrastructure rehabilitation and improvement including urban river flood management,

drainage and sewerage systems, as well as public transport systems; and 3) transport infrastructure, mainly rehabilitation and reconstruction of urban and rural roads. The project will also support the development and strengthening of flood emergency response management systems and capacity building, and support for project management in the three project municipalities.

11. **Expected Results.** The proposed Project is expected to achieve the following results:

- Flood protection standards of the rivers under the project improved.
- Urban drainage systems under the project rehabilitated with improved urban drainage standards.
- Damaged urban public transport systems under the project recovered.
- Damaged rural roads under the project reconstructed.
- Flood emergency response systems of the three project municipalities developed or improved.

12. A set of indicators at the project objective level and intermediate results level will be used to monitor the project achievements. The Results Monitoring Framework (RMF) is presented in Annex 1.

13. **Expected Beneficiaries.** The project will directly benefit a population of about 3.4 million in Zhengzhou Municipality, 2.3 million in Xinxiang Municipality, and 1.6 million in Jiaozuo Municipality. In the long-term, the entire population of around 20 million in the three municipalities will benefit from the project as it will support the rehabilitation and reconstruction of the affected urban and rural infrastructure, recovery of public utilities and services, and improved protection from subsequent flood disasters, therefore, overall economic recovery.

B. Rationale

14. **Strategic fit for AIIB.** The project is in line with the AIIB's purpose of fostering sustainable economic development by investing in infrastructure. By focusing on infrastructure, the project would contribute to AIIB's mandate and its mission of Financing Infrastructure for Tomorrow by investing in sustainable infrastructure through supporting post-disaster reconstruction, assisting the government in building back better with improved flood and drainage standards, and addressing climate resilience. Hence, the project is aligned with two of the AIIB's investment thematic priorities: Green Infrastructure and Technology enabled infrastructure. The project interventions, covering water, urban and transport sectors, align with the respective sectoral strategies of AIIB, particularly with the Water Sector Strategy and its investment focus in three dimensions: resilience, resources management and water services. Given the incorporation in the technical designs on climate adaptation and resilience, the proposed project is eligible to be considered as climate financing.

15. Flood protection and flood risk management are critical to China's national water security. China's "Flood Control Law" (1998) and "Flood Management Regulations" (2005) have laid down the legislative foundations for flood risk management in the

country. Post flood disaster recovery is currently a national priority, particularly in Henan Province.

16. **Value addition by AIIB**. In addition to providing urgently needed finance vital to the post-disaster recovery, AIIB will bring significant value added to the project in the following aspects:

1) Introducing a holistic approach to improving water security in the project design, particularly in integrated flood risk management – taking into account structural (green and gray infrastructure) and non-structural measures covering the entire risk management chain from planning, awareness raising, prediction, early warning, decision support, response, and to post-disaster management.

2) Mainstreaming climate adaption in the project design. The project interventions will include not only "build back" activities but also "build better" intervention with the objective to increase climate resilience and provide for long-term sustainability. AIIB will support the implementing entities to take climate adaptation measures into feasibility studies, technical designs and constructions. The measures will include application of higher flood protection standards, more suitable technologies, *e.g.,* nature-based solutions and combination of grey and green infrastructure, and improved materials. Depending on the nature of the sub-projects, different measures or a combination of multiple measures may be applied.

3) Applying advanced technologies in asset management, operation and monitoring, and support informed decision for flood emergency response. For example, in some flood protection infrastructure, global positioning system will be used in building, inspection, and monitoring of dikes. In the development of integrated water management systems, digital sensors will be applied to monitor water flows and water quality. Integrated flood emergency response systems will apply the 3S technologies (Geographic Information System, Global Positioning System and, Remote Sensing), numerical modeling, and big data integration in the development. These technologies are the enabler to increase the asset value, improve infrastructure sustainability and resilience.

4) Application of international good practices in project management for project quality, and sound environmental and social (ES) standards to safeguard project outcomes. In doing so, the project is expected to become more environmentally sustainable and socially inclusive. In the processes, the implementing entities' capacity in implementing and managing infrastructure investments that comply with international standards will be strengthened.

5) Supporting capacity building for the implementing entities and project stakeholders in managing such large-scale complex projects through applying a holistic approach in project designs, adopting international good practices in managing environmental and social, procurement and financial management risks, and promoting cross-sectoral coordination, hence, enhancing the project quality and sustainability.

17. **Value addition to AIIB**. The project will contribute to capacity building for AIIB and staff in emergency operations. This is AIIB's second emergency project and the largest and most complex operation so far. The project will build on AIIB's own and other multilateral institutions' experience and learning in similar operations and will generate new knowledge benefiting future investment operations technically, and policy-wise. The project will help further strengthen the partnership between AIIB and China. Furthermore, AIIB can learn from the provincial and local governments and the technical partners in implementing and managing infrastructure in disaster-prone areas.

18. **Lessons learned from previous projects.** This emergency project is multisectoral and multidisciplinary and will be implemented in multiple municipalities. It consists of not only emergency recovery activities but also long-term sustainability interventions. Given this, **lessons learned from other projects, especially emergency operations**, financed by AIIB and other multilateral development banks (MDBs) in China have been analyzed and incorporated in the project preparation and design. Such projects include AIIB financed Emergency Assistance to China Public Health Infrastructure Project (2020), the World Bank (WB) financed Yangtze Flood Emergency Rehabilitation Project (1999) and Wenchuan Earthquake Recovery Project (2009).

19. The lessons learned include the importance of adopting a "framework approach" to project preparation to provide a rapid response and flexibility to design. In the meantime, the AIIB team has been working closely with the implementing entities to mobilize best available resources from all sides in the given constrained time period to identify project scope and screen sub-projects at the most detailed level possible. This way, the project quality could be maintained by **upholding the required processes and standards** as for regular projects despite the accelerated project preparation schedule.

20. The project is designed to be implemented in stages based on the lessons learned to suit the need for "building back better" for which reconstructions will integrate **climate adaptation** measures with improved design standards, technologies and materials to increase climate resilience and to achieve long-term sustainability.

21. The lessons also show that establishing **effective and efficient project management institutions** with strong leadership from every government level is vital to successful and rapid project preparation for emergency operations and to a successful implementation as well.

C. Project Components

22. The overall project strategy is to adopt a framework approach in project design while prioritizing the water and flood management, urban and transport infrastructure sectors in three municipalities: Zhengzhou, Xinxiang and Jiaozuo. Given the large gap between financing needs and the AIIB loan amount for post-disaster recovery, sound eligibility criteria for sub-project selection have been developed for the effective and efficient use of the loan. The following criteria have been agreed upon with the government as a guidance in selection of sub-projects. These include:

1) Consistency with the respective national, provincial, and local post-disaster recovery plans, including the relevant thematic plans, if any.

2) Focus on three sectors: water resources/flood management, integrated urban water/environment management, and transport.
3) Priority given to reconstruction and rehabilitation activities that address climate resilience and sustainability.
4) Interventions requiring short preparation time.
5) Priority given to the affected infrastructure with no other sources of financing available.
6) Compliance with national, provincial, and local standards, procedures, and codes.
7) Cost effectiveness and implementation readiness.
8) Addressing environmental, social and safety management requirements.
9) Opportunity for scaling and phasing in accordance with current need, future demand and sustainability.
10) Number of beneficiaries served.
11) Duration of the implementation.

23. According to the above criteria, the municipalities have proposed sub-projects based on their own priorities. The sub-projects are grouped per project municipality as components. Under each component, sub-project activities are categorized per sector. Annex 2 presents further details of project activities.

24. **Component 1 - Zhengzhou Post-disaster Recovery Program (Cost USD811.2 million, AIIB loan USD600 million)**. This component will finance civil works and goods required for rehabilitation and reconstruction activities in the water and flood management, urban and transport sectors in Zhengzhou municipality. The sub-projects are: (a) integrated Jinshui River management project, including riverbank protection, river dredging, reconstruction of riverside roads and bridges, improvement of drainage and sewerage systems, and riverside green spacing and river ecosystems, amongst others; (b) rehabilitation of rural roads and bridges; (c) rehabilitation of the Ying River in Dengfeng City; (d) development of an integrated flood risk management system and strengthening the capacity for emergency response; and (e) project management support for capacity building in procurement, financial management, environmental and social (ES) management and other technical areas.

25. **Component 2 - Xinxiang Post-disaster Recovery Program (Cost USD311.4 million, AIIB loan USD200 million).** This component will include activities to recover damaged infrastructure in the three sectors in Xinxiang municipality. The subprojects consist of: (a) rehabilitation of rivers and canals including river dredging and dike strengthening; (b) rehabilitation of national and provincial highways, urban bus terminals and purchase of electrical buses; (c) rehabilitation and improvement of urban drainage systems; (d) development of integrated flood emergency response system; and (e) project management support.

26. **Component 3 - Jiaozuo Post-disaster Recovery Program (Cost USD276.2 million, AIIB loan USD200 million).** This component consists of interventions to support the recovery of Jiaozuo municipality, including: (a) rehabilitation of rivers and

canals including river dredging and dike strengthening; (b) rehabilitation and improvement of the urban canals, drainage and sewage systems, and roads; (c) development of an integrated flood emergency response system including a smart river management system and a smart urban water management system; and (d) project management support.

D. Cost and Financing Plan

27. The total project cost is estimated at around USD 1.399 billion, and the financing will include the AIIB sovereign backed loan of USD1.0 billion and the counterpart funding of USD399 million. Table 1 shows the Project's cost estimate and financing plan.

Table 1. Project Cost and Financing Plan[7]

Item	**Project Cost (USD million)**		**Financing (USD million)**			
	Sector	Cost	AIIB	Share (%)	Government	Share (%)
Component 1 (Zhengzhou)	Water/flood management	30.4	21.7	71	8.7	29
	Urban	474.7	317.6	67	157.1	33
	Transport	296.2	251.7	85	44.5	15
	Flood emergency response	6.9	6.0	87	0.9	13
	Project management support	3.0	3.0	100	0	0
Sub-total		**811.2**	**600.0**	**74**	**211.2**	**26**
Component 2 (Xinxiang)	Water/flood management	57.9	31.0	54	26.9	46
	Urban	99.3	65	65	34.3	35
	Transport	142.7	94.6	66	48.1	34
	Flood emergency response	9.9	7.8	79	2.1	21
	Project management support	1.6	1.6	100	0	0
Sub-total		**311.4**	**200.0**	**64**	**111.4**	**36**
Component 3 (Jiaozuo)	Water/flood management	103.1	79.5	77	23.5	23
	Urban	154.5	103.9	67	50.6	33
	Flood emergency response	15.5	13.4	87	2.1	13
	Project management support	3.1	3.1	100	0	0
Sub-total		**276.2**	**200.0**	**72**	**76.2**	**28**
Total		**1,399**	**1,000**	**71**	**399**	**29**

[7] Currency exchange rate USD/CNY 6.45 was used in cost estimate.

E. Implementation Arrangements

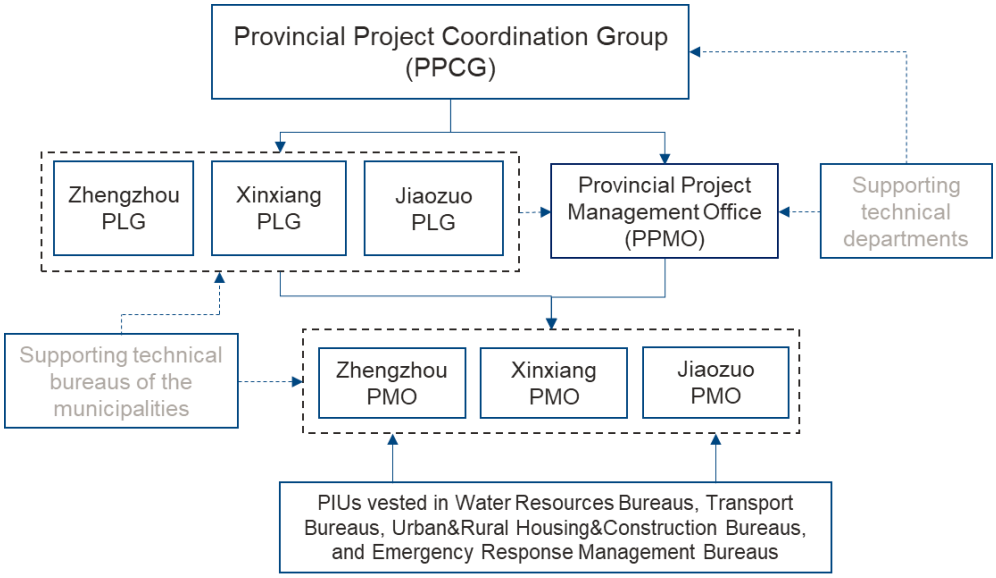
28. **Implementation period**. The Project will be implemented over a period of four years between December 31, 2021, and December 31, 2025.

29. **Implementation stages.** The project will be implemented in a staged manner. In the beginning stage, sub-projects for quick recovery and reconstruction will be implemented in both urban and rural areas to restore the basic functions of infrastructure. Some of the infrastructure, however, in this stage will be recovered with improved design, materials or standards. The sub-projects to be implemented in the later stages are those that will require more time for design and preparing ES assessments and instruments. In the later stages, sub-projects will take an integrated design approach to incorporating climate resilience and meet long-term sustainability needs. In parallel to the implementation of the beginning stage, AIIB's financing will support the government to optimize the designs of the later stage sub-projects, bringing in advanced technical solutions and applying sound ES management.

30. **Institutional arrangements**. Given the complexity of the project, functional and effective institutional arrangements for the project have been established. At the provincial level, an inter-departmental Provincial Project Coordination Group (PPCG) was established by Henan Province, with the leadership of the Department of Finance (DOF) of Henan Province and the provincial Development and Reform Commission (DRC). Under the PPCG, a provincial project management office (PPMO) has been established and is vested within DOF. The PPCG will be responsible for making overall decisions relevant to the project and coordinating project activities with AIIB, Ministry of Finance (MOF) of China and the National DRC, and across municipalities while the PPMO will be mandated to carry out day-to-day tasks for management and coordination for the entire project.

31. Project leadership groups (PLGs) within the three municipality governments also have been established. The municipality PLGs will assume responsibilities similar to the PPCG at the municipality level. Under the PLGs, PMOs have been established to perform day-to-day functions, duties and tasks required for project management at their respective levels. Project implementation units (PIUs) have been established for each sector in the three municipalities and the project counties or cities. The PIUs implementing water and flood management subprojects are anchored in the municipality Water Resources Bureaus, or county or city water resources bureaus. The PIUs for implementing transport sub-projects and urban infrastructure, including urban water and flood management activities, are vested in the municipality Transport Bureaus and Housing, Urban and Rural Construction Bureaus, respectively. Each project municipality has established a PIU in its Emergency Response Management Bureau for implementing the flood emergency response development sub-project. PMOs and PIUs are staffed with technical professionals covering the key areas in project management, procurement, financial management, environmental and social (ES) management, project implementation monitoring etc. Figure 1 indicates the institutional arrangements for project management and implementation.

Figure 1: Institutional arrangements for project management



32. **Procurement.** AIIB's Procurement Policy (dated January 2016) and its associated Interim Operational Directive on Procurement Instructions for Recipients (PIR, dated June 2, 2016) shall apply to the procurement of all contracts funded in whole or in part by the AIIB loan under the project. Since the project implementing entity, the PMOs and their subsidiary PIUs are public entities as defined per the AIIB Procurement Policy, the specific procurement provisions under Section II Procurement of Goods, Works and Services by Public Entities under PIR shall apply to procurement under the Project.

33. Each municipality PMO will be responsible for coordination, supervision, review and organization of all aspects of the procurement process and contract management with active participation of all PIUs that have technical knowledge in water and flood management, transport and urban infrastructure. Procurement staff at each implementing entity level have been appointed and mobilized to start procurement preparation and implementation. In addition, procurement professionals or project management consultants, which have experience with MDB financed projects, will be appointed to assist in procurement and project implementation. Project Delivery Strategies (PDS') including Procurement Plans (PPs) have been developed by the municipality PMOs and have been reviewed and accepted by AIIB at the appraisal stage. The PDS' and PPs, which will be updated regularly or when/as needed for AIIB review and no objection during project implementation, shall be the basis for the implementing entities to carry out project procurement. In the PDS' and PPs, contract packaging, cost estimates, procurement method and AIIB review method, tender documents to be used, as well as specific procurement timelines, and advance contracting/retroactive financing, have been set out.

34. The roles and responsibilities of PMOs and PIUs shall be set out clearly in the procurement manual, included as a part of the PIM. The manual will define the review procedures to be followed, the responsibilities of each implementing entity at each procurement step. Each municipality PMO will be responsible for compliance with AIIB procurement policy and requirements.

35. In principle, International Open Competitive Tendering/Selection (IOCT/IOCS) will be the default approach. With this approach, the AIIB's Standard Procurement Documents (SPDs) will be used when the cost estimates of works, goods and consulting services are higher than USD40 million, USD10 million, USD500,000 respectively, unless sufficiently justified otherwise in the PDS' as per the relevant PIR provisions. Procurement of any consulting services contract with value larger than USD 500,000 shall be carried out through IOCS applying Quality & Cost Based Selection procedures and using the AIIB's SPD - Request for Proposals Consulting Services.

36. Given the emergency nature of the project, Request for Quotations may be used with the aim of shortening the procurement time. Some project activities could be procured through Direct Contracting/Selection to meet the demand for fast rehabilitation and recovery of some public facilities, including quick mobilization of tender agents, engineering design consultancies, construction supervision companies or works contractors. Such procurement methods, if needed, will have to be justified as per the AIIB's Procurement Policy and PIR. The specific procurement arrangements for each contract have been specified in the PPs.

37. Some of the contracts may be procured and paid for before loan agreement signing subject to prior agreement of AIIB. As such, Retroactive Financing might be used, subject to the limit of up to 20 percent of the total amount of the loan, and for expenditures incurred and paid on or after July 20, 2021 and no more than 12 months prior to the expected date of signing of the loan agreement. Any project activities that are considered for advance contracting and retroactive financing must meet the requirements stipulated by AIIB's Procurement Policy and Environment and Social Policy (ESP).

38. The procurement of works and goods under each sub-project will be conducted through each municipality level Public Resources Trading Center in accordance with AIIB's procurement requirements. Based on the assessment, the national procurement laws, regulations and rules, public procurement procedures are materially consistent with the Core Procurement Principles of the AIIB's Procurement Policy. Therefore, the National Competitive Tendering method could be applied in some cases in this project whereby local tendering documents may be used, provided that AIIB procurement policy provisions will be incorporated into such tendering documents.

39. Before initiating any procurement, the PPMO will prepare the project General Procurement Notice (GPN) as per AIIB's GPN template and submit the GPN to AIIB for review. Subsequently the GPN shall be published in a media of national circulation in China. In the meantime, AIIB will assist with GPN publications on the websites of AIIB and United Nations Development Business (UNDB).

40. During project implementation, the Bank team will carry out procurement oversight of all contracts to be funded by the AIIB loan through procurement prior review for large value and complex contracts, and post review for all other contracts on a regular basis. The implementing entity will establish a document record management system to keep all procurement related documents in its office for AIIB's future post review as well as audit by the government authorities.

41. **Financial Management (FM)**. The project implementing entity shall cause the project municipalities to maintain financial management and auditing arrangements acceptable to AIIB for proper usage of the project funds. Interim project financial statements in the format agreed by AIIB shall be prepared on a semi-annual basis and be submitted to AIIB within 45 days after the end of the semester. Project financial audits on the consolidated project financial statements will be conducted by the Henan Provincial Audit Office on a semi-annual basis, and such audit reports and audited financial statements shall be submitted to the AIIB within three months after the end of each reporting period.

42. **Monitoring and Evaluation**. A project monitoring and evaluation (M&E) system based on the Results Monitoring Framework (RMF) will be established to monitor and evaluate the project performance, progress and achievement of project outcomes. The RMF includes appropriately defined project objective indicators, intermediate results indicators and the corresponding targets that are realistic and measurable. All indicators will be regularly monitored and updated in the project progress report. In the first year of project implementation, each project progress report shall cover a period of three months. Thereafter, project progress report will be on a semi-annal basis. The progress reports will be prepared by the municipality PMOs, reviewed and summarized by PPMO, and then submitted by PPMO timely to AIIB for review. PIUs in each municipality will be responsible for subproject monitoring data collection and preparation of their separate subproject implementation reports.

43. **AIIB's Implementation Support.** The project implementation will be supported by regular implementation support missions undertaken by the AIIB project team. The AIIB's regular missions will be carried out three times a year in the first year, given the complexity of the project and expected fast implementation speed in the early stage, and thereafter twice a year. The AIIB mission team will include the project team leader (PTL), co-PTL, procurement and FM specialists, ES specialists, and technical and institutional specialists and/or consultants, as appropriate. In addition to the regular implementation support missions, it is anticipated that the project will require more support in the early stage of implementation including review of the feasibility studies and technical designs.

44. A comprehensive midterm review will be conducted at an appropriate time during project implementation. The midterm review mission will assess the project implementation performance from all aspects and will discuss, agree, and take any midterm course corrections deemed necessary.

3. Project Assessment

A. Technical

45. **Project Design**. The proposed project is an emergency operation and therefore the framework approach as described above is adopted for the overall project design. Under the framework, the government has proposed a list of prioritized project activities. These activities align with the Master Plan for post disaster recovery. The municipalities have started preparing technical designs for some works requiring urgent rehabilitation. For those sub-projects that require feasibility studies and improved designs, the

municipalities have started engaging specialized consultancy firms to prepare such studies and designs. All sub-projects will be further screened and appraised during project implementation as the project framework dictates. All designs will follow the national codes and standards for each of the sectors/sub-sectors.

46. Climate adaption is an essential consideration in the project design. The project interventions will include not only quick restoration, *i.e*. “build back”, activities but also “build better” activities with the objective to increase climate resilience and provide for long-term sustainability. In all these activities, climate adaptation measures are required to be taken into feasibility studies and technical designs. The measures encompass various approaches, including application of higher flood protection standards, more suitable technologies, *e.g*. nature-based solutions and combination of grey and green infrastructure, and improved materials. It was made aware to the implementing entities that updating the historical hydrometeorological data series by including the 7.20 flooding data in the studies and designs is important to improve the design quality and to achieve better climate resilience for the rehabilitated and reconstructed infrastructure.

47. AIIB will support the government to take a holistic approach to carrying out feasibility studies and designs, looking beyond administrative boundaries and sector divisions. Such an integrated approach will enable seeking optimal solutions, improved institutional coordination, and information sharing.

48. In preparing the flood risk management sub-projects, an Integrated River Basin Management approach is required in the technical studies and designs, independent of administrative boundaries and/or division of sectoral responsibilities in water management. Such projects should also accord to the river basin planning and basin flood management planning of the river basins where the sub-projects are located. Taking this approach, inflows from upstream rivers and canals, from the drainage catchment, the downstream hydrological and hydraulic conditions of the receiving water bodies (rivers or canals) will be appropriately considered. For the sub-projects in the urban sector, an Integrated Urban Management approach should be applied to achieve sustainable urban development. This approach embraces multiple dimensions: flood and drainage, sewerage and sanitation, environment and ecology, landscape and society, transport and safety.

49. In the development of flood emergency response capacity, the full disaster-risk-management (DRM) chain concept would be embedded in the design of these activities. Given that natural disasters including flooding are expected to occur more frequently in future with the changing climate, disaster risk prevention and reduction is the core of DRM, covering risk knowledge development, public awareness raising and education, integrated early warning, emergency response, impact mitigation and post-disaster recovery, amongst others. It involves policies, planning, investments and institutional arrangements. In this project activity, flood emergency response capacity building is a focus while it is not expected that a complete and comprehensive flood emergency response system will be adopted or that capacity building will cover all aspects. However, the full DRM chain approach is the starting point for conceptualizing the design framework.

50. In addition, adopting nature-based technologies and practices where possible to achieve integrated green-grey infrastructure development will be considered in the

project to enhance climate resilience. Other aspects to be taken into account in the technical designs include: (1) seeking optimal designs through scenario analysis and by learning from the disaster, (2) applying improved design standards, (3) applying appropriate ES standards; and (4) following the value-for-money principle.

51. **Operational sustainability.** The operational sustainability is subject to various factors including the quality of the construction and materials, operation and maintenance (O&M) capacity of the asset owners, and sufficiency of the funding for O&M. The infrastructure recovered and/or reconstructed by this project are public assets and will be managed by the respective government agencies that generally have adequate capacity and stable funding flows for O&M. However, these factors will be further assessed and addressed during project implementation.

B. Economic and Financial Analysis

52. **Scope of Economic Analysis.** As this proposed project is an emergency operation which aims to reinstate critical public infrastructure services to facilitate the restoration of economic activities and livelihoods of the affected population, a comprehensive economic and financial analysis was not feasible during project preparation, due to the fact that feasibility studies for the sub-projects had not yet been prepared, limited data was available at the of project preparation, and emergency support had to be made available as early as possible. Therefore, the economic analysis at the project preparation stage only outlines the expected project benefits and costs and describes the economic and social value and the benefits resulting from the rehabilitation and reconstruction of critical infrastructure and the improvement in flood resilience capabilities. More comprehensive economic analysis will be carried out on a sub-project basis, during the preparation of feasibility studies for the sub-projects.

53. **Project Costs and Benefits.** The project costs will mainly include investments to support recovery and reconstruction of damaged or lost vital infrastructure in the following categories: flood management, urban flood and drainage, urban sewage network, urban public transportation infrastructure, highways, rural roads and bridges, and other related facilities.

54. The main economic benefits of this project are: (a) restored economic activities and public infrastructure services; (b) avoided future costs of interruption on economic activities as well as damages, and losses to various sectors and/or stakeholders from future floods; (c) value of reduced scope and probability of property damages due to flooding as a result of enhanced flood protection and urban drainage standards, hence improved climate resilience; (d) avoided future costs of emergency response, benefiting from increased capacity in flood emergency response management; (c) restored and enhanced ecosystem services value; and (d) appreciation of land value in urban areas. Furthermore, additional temporary employment and other multiplier effects in the form of associated economic activities will be generated during the pre-construction and construction period. It is anticipated that the project benefits would far outweigh the project costs. Many of the project activities aim to quickly repair and rehabilitate the damaged infrastructure critical to social and economic services, which were existing prior to the 7.20 flooding, therefore the economic and social value of such sub-projects have been proven throughout their operation and services before the disaster.

55. China has remarkably improved its flood risk management and flood resilience capacity in the past few decades (see Annex 5), as well as Henan Province. As a result, the proportion of direct economic losses to GDP has been reduced from 1.9 percent in 1998 to 0.3 percent in 2016[8], although the absolute value of the direct economic losses due to flooding increased because of the development of the overall economy of the country. However, challenges remain. Particularly, in the time of climate change, flood risk could be expected to occur at higher frequency. The GDP of Henan Province in 2020 was around USD800 billion (see Annex 3), of which Zhengzhou municipality makes up 21 percent, Xinxiang 5 percent, and Jiaozuo 5 percent, respectively. Without adequate preparation for climate change and building climate resilience, the economy of the three municipalities, hence the province, will be at risk. Therefore, the economic value of the proposed project can be demonstrated as it will contribute to reducing the flood risk and the resulting economic loss due to climate change since climate adaption measures will be incorporated in the sub-project designs.

56. It is not possible for the limited AIIB loan to cover all the damaged infrastructure in the province, however, the sub-projects to be implemented in the selected project municipalities will restore the critical infrastructure, facilities and social services, thereby helping regenerate economic production and activities. Restoring and improving the water security of the project areas will help improve infrastructure's climate resilience and enhance the long-term sustainability of the economy.

C. Fiduciary and Governance

57. **Procurement.** The project implementing entity has established municipality PMOs and respective PIUs at the sector bureaus. The PPMO is currently in the process of being established. PIUs implementing flood management sub-projects at the county level have also been established. PMOs and PIUs have appointed procurement staff and are ready for project preparation and implementation. The Jiaozuo and Zhengzhou PMOs have certain procurement experience with implementation of MDB financed projects in the past few years. Xinxiang PMO does not have experience with MDB financed projects, although several high-level PMO staff participated in implementation of MDB funded projects around 10 years ago.

58. A procurement capacity assessment was carried out. All procurement staff of the municipality PMOs and PIUs have experience with public procurement funded by the government. They are familiar with local public procurement laws and regulations and have empirical knowledge and practices with implementing government funded projects. Given the local procurement laws and regulations are substantially consistent with the AIIB core procurement principles, and it is expected that in many cases in this project national competitive tendering will be applied whereby local tendering documents will be used, AIIB is satisfied with the current organizational arrangements, qualifications and competency of the procurement staffing.

59. The procurement staff of PMOs and PIUs have received procurement training on the AIIB Procurement Policy requirements. In addition, external professional procurement agents and project management consulting firms to be employed by PMOs

[8] Li Y. and Sarah Y, T., 2020. The Silver Lining in China's Worst Flood in Decades, EAI Commentary, East Asian Institute, National University of Singapore.

will be responsible for procurement policy compliance. Construction supervision agencies will be employed by PIUs to carry out construction management supervision.

60. Based on the above assessment on procurement capacity for the implementing entity and the PMOs/PIUs, some procurement related risks were identified, and mitigation measures have been put forward and will be adopted. The mitigation measures will help strengthen the procurement capacity of the PMOs and PIUs to comply with the procurement requirements, and thus, successful project implementation. The project procurement risk level was assessed as Medium. The major risks identified as well as mitigation measures are summarized in the section of Risks and Mitigation Measures.

61. **Financial Management.** Given the complexity of project implementation and lack of experience in operating MDB financed projects, the AIIB team has supported the counterpart agencies to optimize and streamline their FM institutional arrangements. PIUs will be responsible for project implementation, contract management, project accounting and financial reporting. PPMO and municipality PMOs will be staffed with FM and disbursement professionals who will oversee, monitor and guide PIUs' work, including reviewing their withdrawal applications, preparing municipality consolidated financial statements, coordinating with other agencies at the municipality and provincial levels, respectively, and with AIIB during and throughout project implementation.

62. All the PIUs will follow their existing internal review procedures to make contract payments, retain originating documents and prepare financial records. Such arrangements and practices are generally acceptable to AIIB. The PPMO and municipality PMOs will reconcile financial records with PIUs and prepare consolidated project financial statements in the format agreed by AIIB.

63. Counterpart funds have been committed by the local government for timely provision for successful project implementation. With project activities defined and approved, local governments will issue budget circulars to appropriate necessary funds on a yearly basis based on the project's progress.

64. To meet the needs of this emergency operation, AIIB has streamlined and simplified its ex-ante requirements while relying more on ex post requirements for appropriate fiduciary controls and reviews. The following oversight arrangements (including governance and fiduciary arrangements), which have been discussed with and agreed by the borrower, will be in place to provide for proper usage of the project funds: (i) the provincial DOF and some municipality finance bureaus with experience in managing MDB-financed operations and oversight of loan proceeds will provide fiduciary assurance; (ii) the PPMO and municipality PMOs will organize training and peer learning events to furnish project financial staff with the necessary fiduciary knowledge; (iii) in addition to the general rules issued by the MOF governing MDB-financed operations, the AIIB project team will guide and assist the borrower to prepare a project FM Manual, as part of the PIM, to standardize the project FM and disbursement for this multi-disciplinary project involving multiple locations. The Manual will specify the roles of implementing agencies, funds management, contract payment management, financial reporting, and audit arrangements; (iv) the project will adopt a computerized project management information system (MIS) which integrates project implementation information including on procurement, FM, disbursement, and project financial reporting. With the MIS in place, the financial report can be automatically generated, and real-time information of each implementation agency will be available for project monitoring in a

timely manner; (v) experienced consultants will be engaged to strengthen project implementation capacity; (vi) project audits will be conducted on a semi-annual basis to enhance external review and provide stronger fiduciary assurance; and (vii) the AIIB project team will conduct more frequent and intensive supervision missions, particularly in early implementation when FM arrangements are being established**.**

65. **Funds Flow**. The loan will be on-lent from the MOF to the GOH, then to the municipalities of Zhengzhou, Xinxiang and Jiaozuo and respective counties directly or indirectly through the municipalities in accordance with internal regulations of Henan Province, on the same terms and conditions as the loan to the Government of China. MOF will authorize GOH to submit disbursement claims to AIIB directly. The loan proceeds will be managed by Henan DOF, which will use its fiscal and debt management system in budget allocation, funds release and contract payments based on the approved sub-project proposals, procurement plans and the PIUs' requests. The DOF and finance bureaus of the municipalities and counties will be responsible for reviewing disbursement applications and making payments to contractors.

66. With all the above arrangements and actions, the overall project financial management system has been assessed as acceptable to AIIB, meeting the requirements of AIIB's Operational Policy on Financing (March 20, 2020). It was therefore concluded that adequate FM arrangements will be in place for the project to provide reasonable assurance that the proceeds of the loan will be used for the purposes for which they are granted.

67. **Governance and Anti-corruption**. AIIB's Policy on Prohibited Practices (2016) will apply to this project and has been explained to PMOs. Implementation will be monitored regularly by AIIB. AIIB reserves the right to investigate, directly, or indirectly through its agents, any alleged corrupt, fraudulent, collusive, theft, misuse of resources, fraudulent practices, obstructive practices or coercive practices related to the proposed Project and to take necessary measures to prevent and redress any issues in a timely manner, as appropriate.

D. Environmental and Social

68. **Environmental and Social Policy and Standards**. The AIIB's Environmental and Social Policy (ESP), including the Environment and Social Standards (ESSs) and the Environmental and Social Exclusion List (ESEL), is applicable to the proposed project. Given the emergency nature of the project, a phased approach for addressing ES risks and impacts has been adopted, which is appropriate and permitted under the ESP for Situations of Urgent Need of Assistance.

69. AIIB's ESS1 and ESS2 apply based on the ES screening and due diligence conducted during project preparation on the sub-projects that were proposed by the government. Based on available information and site visits to date, it is not anticipated that ESS3 will apply since communities of ethnic minorities (Indigenous Peoples) are unlikely to be present in the areas of the sub-projects. As a precautionary measure; however, all sub-projects will be screened for the possible presence of ethnic minorities as defined under ESS3 and appropriate actions will be taken if such communities are present.

70. **Categorization and Instruments.** Based on the review of the sample potential sub-project activities, Category A has been assigned to the project. The proposed project will involve rehabilitation and reconstruction of the damaged infrastructure in three sectors and the sub-project activities will mostly involve localized ES impacts, especially in the context of a natural disaster and significant physical damage caused by flooding in urban and rural areas. It is also expected that the ES risks and potential impacts of some of the sub-project activities are likely to be significant, cumulative, diverse, and may affect areas larger than the sites or facilities subject to physical works and could be partially permanent in nature.

71. **Environmental and Social Management Planning Framework**. Given that the detailed activities under the sub-projects to be included in this emergency project have not been fully identified and finalized in the project preparation, the ES instrument to be used for the project will be an Environmental and Social Management Planning Framework (ESMPF). With substantial support from AIIB, and collaboration between GOH and the municipaility governments, the draft ESMPF has been prepared in both English and Chinese languages. The ESMPF covers: (a) background and objectives; (b) description of the Project; (c) key policies and regulations on environmental and social issues issued by the AIIB and the Government of China; (d) approach to addressing ES issues; (e) screening, impact assessment and management of ES risks; (f) institutional arrangements with respective responsibilities and processing procedures; (g) Grievance Redress Mechanism (GRM) and applicability of AIIB's independent accountability mechanism, the Project-affected People's Mechanism (PPM); and (h) supervision, monitoring and evaluation and reporting arrangements. Some technical supporting and guidance tools, such as the ES screening table and indicative outline of an Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP), including a Resettlement Plan (RP), are included in the ESMPF as annexes.

72. **Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP)**. During project implementation, ESIAs and ESMPs required for identified sub-projects will be prepared based on the initial screening of their ES risks and potential impacts, and in accordance with the ESMPF. If land acquisition and resettlement are required for, or associated with, any proposed sub-project activities, a RP for each of these sub-projects shall be prepared. Any sub-project proposed for retroactive financing, will only be eligible to be included in the project if an ES audit satisfactory to AIIB has been conducted demonstrating that the requirements of ESMPF have been met, or that any corrective measures will be implemented during the implementation period of the overall project.

73. **Environmental Risk and Impact Management**. Based on the information available for the proposed activities, especially the ones for urban and transport sectors, such as rehabilitation or reconstruction of roads in urban and rural areas, drainage systems, etc. the ES impacts and risks are expected to be minor, localized, and manageable through the application of appropriate mitigation measures and good management practices in an operational setting.

74. It is, however, also expected that some proposed activities, such as rehabilitation or construction of river dikes, river dredging, and reconstruction of bridges, could lead to significant ES risks and impacts. Some of these activities might be located in

environmentally sensitive locations, such as nature reserves, areas of significant biodiversity features or cultural heritage sites, and some might require land acquisition and resettlement. For Category A sub-projects, ESIAs and ESMPs will be prepared during sub-project preparation, based on their ES screening, in order to meet the requirements of AIIB's ESP and the national ES policies, regulations, including public consultation and information disclosure. Furthermore, ES review and clearance of the categorization and ES instruments (including consultation on them and their disclosure) for each sub-project to be included in the project will be required by AIIB prior to commencement of any activities under the sub-project.

75. **Social Risk and Impact Management.** The proposed project is expected to generate largely positive social benefits to the overall population. The preparation of sub-projects will involve substantial community interface and potential risks and impacts, which will be identified in the assessments to be conducted for each sub-project. Social risks and impacts may include loss of livelihood or from physical or economic displacement due to temporary or permanent land acquisition. In some cases, access restriction or impacts due to noise, dust, light etc. is also envisaged. Appropriate measures will be taken to address social impacts in the sub-project specific ESIAs and ESMPs, which will also be prepared during sub-project preparation. The assessments will generate gender disaggregated data at the community level which will inform designs for sub-projects including their mitigation plans to address the requirements of women. The gender disaggregated data will also be used for results monitoring.

76. **Climate Change Risks and Opportunities.** The proposed project will contribute to both climate mitigation and adaptation. The project will strengthen the resilient capacity of the project municipalities by integrating climate adation measures into the reconstruction and rehabilitation of the damaged public infrastructure and strengthening the climate induced disaster risk management system including early warning systems. This is aligned with China Nationally Determined Contribution (NDC) on climate change adaptation i.e., "to improve safe operation of infrastructure of water conservancy, transport, and energy against climate change". The project consists of a sub-project for rehabilitation of the public transport system, which involves procurement of electric busses to replace the damaged busses. This activity qualifies as climate mitigation. Based on an intial assessment, at least 40% of AIIB's financing for this project is anticipated to qualify as climate adaptation and mitigation finance according to joint MDB methodology on climate finance tracking.

77. **Gender, Labor and Disability Aspects.** The potential impacts of sub-project activities - both positive and adverse - on women and the disabled in the sub-project communities will be assessed during sub-project preparation. Women will be engaged in planning and implementation, when they are the potential beneficiaries or women are disproportionaley impacted due to the absence of such facilities. Gender disaggregated data will be generated in case of physical and economic displacement and special emphasis will be placed on use of appropriate rehabilitation measures to address impact on women. In consultation with relevant stakeholders, including the government agencies and community members, measures such as community-based disaster risk management measures with elements of gender inclusion, labor safety and occupational health and disabled-friendly features will be introduced at the sub-project level.

78. **Stakeholder Engagement, Consultation and Information Disclosure.** Consultations with various stakeholders have been conducted during preparation of the ESMPF, including meetings with various governmental departments of Henan Province, and the project municipalities, such as the Ecology and Environment Department, Natural Resource Department, and Emergency Management Department. Consultations with other project stakeholders such as PMOs, design institutes, and local communities were conducted during project site visits. Stakeholder consultation will continue throughout project implementation to assist in preparation of respective sub-project ESIAs and ESMPs, taking into account the national and local guidelines on restrictions on travel and/or public gatherings due to the COVID-19 pandemic. The English and Chinese versions of the ESMPF have been posted on the government websites including the GOH website and websites of the three municipalities of Zhengzhou, Xinxiang and Jiaozuo, also AIIB's website, respectively[9]. Hard copies will be made available at the sub-project sites before commencement of sub-project activities. Sub-project specific environmental and social documents will be posted in English and Chinese and made available in hard copy in a similar manner.

79. **Project-level Grievance Redress Mechanism (GRM).** The general principles for GRMs are included in the ESMPF and details will be developed and included in the sub-project specific ESIAs and ESMPs. GRMs will be established at the sub-project level for project-affected people. The Contractors will set up GRMs for project workers in the worksites. The GRMs will provide information to about the Project-affected People's Mechanism (PPM) described below.

80. **Supervision and Implementation Support for Environmental and Social Management**. ES supervision and implementation support by AIIB during project implementation will be important to confirm the application of AIIB's ES requirements, and manage the project's ES risks and impacts. The AIIB team will work closely with the implementing entities and their consultants so that they fully understand the relevant ES policies and requirements, incorporate them into the ESMPF and sub-project-specific ESIAs and ESMPs and apply them appropriately. The AIIB team will be responsive to the client's needs and provide adequate and timely support to assist in enhancing the client's institutional and technical capacity for ES management throughout project implementation.

81. **Project-Affected People's Mechanism**. The PPM has been established by AIIB to provide an opportunity for the independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by the AIIB's failure to implement its ESP in situations when their concerns cannot be addressed satisfactorily through the Project-level GRM or the AIIB's management processes. Information on the Project-affected People's Mechanism is

[9] AIIB website: https://www.aiib.org/en/projects/details/2021/proposed/China-Henan-Flood-Emergency-Rehabilitation-and-Recovery-Project.html
Government of Henan website: http://czt.henan.gov.cn/2021/11-05/2342160.html
Zhengzhou Municipality website: http://zzcz.zhengzhou.gov.cn/ggtz/6028610.jhtml
Xinxiang Municipality website: http://czj.xinxiang.gov.cn/sitesources/xxsczj/page_pc/xwdt/tzgg/article09a8fe0e11a044589f6974813dad9554.html
Jiaozuo Municipality website: http://czj.jiaozuo.gov.cn/article/19442.html

available at: https://www.aiib.org/en/policies-strategies/operational-policies/policy-on-the-project-affected-mechanism.html.

E. Risks and Mitigation Measures

82. Summary of risks and mitigating measures are presented in Table 2.

Table 2: Summary of Risks and Mitigating Measures

Risk Description	Assessment (H/M/L)	Mitigation Measures
Technical A fragmented approach to the design of flood management and urban drainage projects, inconsistent standards and codes in the design could undermine the sustainability of the project activities.	Medium	1. Specialized and reputable engineering/design firms will be employed for the project. 2. PPMO will organize seminars for design firms, with AIIB's support, to exchange learnings and experience for optimal solutions from the technical, economic and ES perspectives. 3. The governments will mobilize experts to review the designs.
Implementation arrangements PMOs and PIUs may have weak capacity at the beginning, and their roles and responsibilities may lack clarity.	Medium	1. The governments have established leadership groups at the provincial and the municipality levels. PMOs and PIUs will be further strengthened with skilled, trained staff and consultants. 2. AIIB team will support the PMOs/PIUs in project management and the AIIB loan will finance the project management support.

Risk Description	Assessment (H/M/L)	Mitigation Measures
Procurement 1. Staff of PMOs and PIUs are not familiar with AIIB Procurement Policy and SPDs. 2. The client may decide to use government procurement provisions that could be in conflict with AIIB procurement requirements. 3. Procurement will involve PMOs/PIUs at different implementation levels, leading to potential coordination challenges and non-compliance risk.	Medium	1. AIIB team has provided and will continue to provide procurement training, support and guidance to the PMOs throughout the procurement and contract management processes. 2. PMOs will employ professional procurement agents and project management firms to support the procurement processes. 3. All high value or complex contracts will be subject to procurement prior review by AIIB. 4. PMOs will prepare a procurement manual specifying clear roles, responsibilities and procedures to be followed by each participating party and provide clear guidance on the procurement processes at the project early stage. 5. During project implementation, construction supervision consultants will also be employed to carry out contract management and construction supervision.
Financial Management Multilayer implementation arrangements and staff's unfamiliarity with AIIB's fiduciary requirements / procedures will expose the project to fiduciary risks of misuse or inefficient use of project funds.	Medium	1. AIIB team has guided the counterpart agencies to optimize the fiduciary implementation arrangements. 2. Experienced consultants will be engaged to assist and strengthen FM capacity. 3. AIIB team has worked with counterpart to explore a streamlined funds flow arrangements so that sufficient but not excessive controls are in

Risk Description	Assessment (H/M/L)	Mitigation Measures
		place to allow for proper use of loan proceeds. 4. A designated Project FM Manual as a part of the PIM will be prepared to formalize and standardize project financial management and disbursement arrangements. 5. Project audits will be conducted on a semi-annual basis to enhance external scrutinization and provide stronger fiduciary assurance. 6. PPMO will organize trainings and peer learning events to furnish project financial staff the necessary knowledge of MDB-financed operations.
Environment & Social 1. Limited institutional capacity in developing, implementing and monitoring the ESMPF and ESMPs for such emergency operations. 2. The project is infrastructure focused, and some subprojects may require land acquisition, which could lead to implementation delays.	High	1. AIIB team will guide and support the PMOs in their preparation and implementation of the ESMPF and other ES instruments. 2. AIIB has provided and will continue to provide training to PMOs' and PIUs' staff throughout project preparation and implementation and conduct regular supervision on ES management. 3. PMOs and PIUs will employ competent ES professional staff to carry out ES functions and specialized firms or consultants may be hired to develop ESIAs, ESMPs and ES monitoring. 4. While designs for some of the sub-projects may require land acquisition, they will be optimized to reduce land acquisition.
Overall	**High**	

Annex 1: Results Monitoring Framework

A. Results Monitoring Framework for Component 1 - Zhengzhou Post-disaster Recovery Program

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.										
Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	**Notes**
			2021	**2022**	**2023**	**2024**	**2025**				
Project Objective Indicators (Zhengzhou)											
Flood protection standards of the rivers under the project improved.	Number	0	0	0	4	4	4	4	Annual	PIU - Zhengzhou Urban and Rural Construction Bureau	The current flood control standards of upstream 8# weir to 9# weir section (900 meters), Dihu outlet section (900 meters), North Daxue Road Bridge section (800 meters) and North Zhakou Railway Bridge section (1900 meters) do not meet the traget 20-year flood protection standard. The project will improve the standard of Jinshui River to 20-year flood standard as a whole.
		0	0	1	1	1	1	1	Annual	PIU - Dengfeng Water Resources Bureau	At present, the flood protection standard of Shidao section of Ying River is less than 10-year; Gaocheng Town is less than 20-year; Dajindian section is less than 10-year flood. The project will incraese the flood proection standard of the Ying River 20-year.
Urban drainage systems under the	Number	0	0	8	8	8	8	8	Annual	PIU -	Renovation and improvement of

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.										
Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	**Notes**
			2021	**2022**	**2023**	**2024**	**2025**				
project rehabilitated with improved urban drainage standards.										Zhengzhou Urban and Rural Construction Bureau	8 drainage systems along Hanghai Road, Huaihe Road, Longhai Road, Jianshe Road, Xihezhonghe Road, Er'qi Road, Zijingshan Road and Weilai Road.
Damaged rural roads under the project reconstructed.	Km	0	45	783	783	783	783	783	Annual	PIU - Zhengzhou Road Development Center	
Flood emergency response systemdeveloped or improved	Number	0	0	0	1	1	1	1	Annual	PIU - Zhengzhou Urban and Rural Construction Bureau	
Intermediate Results Indicators (Zhengzhou)											
Urban Road Rehabilitated and constructed	km	0	0	0	1.3	1.3	1.3	1.3	Semi-annual	PIU - Zhengzhou Urban and Rural Construction Bureau	
Urban Dikes rehabilitated and constructed	km	0	0	4.8	38.8	38.8	38.8	38.8	Semi-annual	PIU - Zhengzhou Urban and	

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.										
Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	**Notes**
			2021	**2022**	**2023**	**2024**	**2025**				
										Rural Construction Bureau	
Urban Bridges rehabilitated and constructed	number	0	0	20	60	60	60	60	Semi-annual	PIU - Zhengzhou Urban and Rural Construction Bureau	
Pumping Stations rehabilitated and constructed	number	0	0	0	3	3	3	3	Semi-annual	PIU - Zhengzhou Urban and Rural Construction Bureau	
Urban sewarge pipelines rehabilitated	km	0	0	7.6	9.6	9.6	9.6	9.6	Semi-annual	PIU - Zhengzhou Urban and Rural Construction Bureau	
Rural roads rehabilitated	km	0	45	783	783	783	783	783	Semi-annual	PIU - Zhengzhou Road Development Center	

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.										
Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	**Notes**
			2021	**2022**	**2023**	**2024**	**2025**				
Rural bridges rehabilitated and constructed	number	0	12	163	175	175	175	175	Semi-annual	PIU - Zhengzhou Road Development Center	
Sedimentated rivers dredged	Km (and/or m^3)	0	0	8	8	8	8	8	Semi-annual	PIU - Zhengzhou Urban and Rural Construction Bureau	Volume of sediment dredging: 105,000 m^3.
		0	0	35.5	35.5	35.5	35.5	35.5	Semi-annual	PIU- Dengfeng Water Resources Bureau	Volume of sediment dredging: 740,000 m^3.

B. Results Monitoring Framework for Component 2 - Xinxiang Post-disaster Recovery Program

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.										
Project Objective Indicators (Xinxiang)											
Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	
			2021	**2022**	**2023**	**2024**	**2025**				
Flood protection standards of the rivers	Number	0	0	0	3	3	3	3	Annual	PIU – Xinxiang Water Resources	The current flood protection standard for Gong Canal is 20-year. After the project, the

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.										
Project Objective Indicators (Xinxiang)											
Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	
			2021	**2022**	**2023**	**2024**	**2025**				
under the project improved.										Bureau PIU – Xinxiang Urban and Rural Construction Bureau PIU- Weihui Water Resources Bureau	protection standrad will be improved to 100-year. The current flood protection standard of the urban section of the Wei River is 10-year. The project will incraese the standard to 20-year. Currently the flood protection stanard of the Cang River in Weihui City is 10-year and the project will improve the protection standrd to 20-year.
Urban drainage systems under the project rehabilitated with improved urban drainage standards.	Number	0	0	0	2	2	2	2	Annual	PIU – Xinxiang Urban and Rural Construction Bureau	
Damaged urban public transport systems/Terminals under the project recovered.	Number	0	0	4	4	4	4	4	Annual	PIU – Xinxiang Transport Bureau	
Flood emergency response system developed or improved	Number	0	0	1	1	1	1	1	Annual	PIU – Xinxiang Water Resources Bureau PIU – Xinxiang	

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.										
Project Objective Indicators (Xinxiang)											
Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	
			2021	**2022**	**2023**	**2024**	**2025**				
										Urban and Rural Construction Bureau PIU – Xinxiang Emergency Bureau	
Intermediate Results Indicators (Xinxiang)											
Urban Road Rehabilitated and constructed	km	0	0	0	2.3	2.3	2.3	2.3	Semi-annual	PIU – Xinxiang Urban and Rural Construction Bureau	
Urban Dikes rehabilitated and constructed	km	0	0	0	13	13	13	13	Semi-annual	PIU – Xinxiang Urban and Rural Construction Bureau	
Urban Bridges rehabilitated and constructed	number	0	0	0	1	1	1	1	Semi-annual	PIU – Xinxiang Urban and Rural Construction Bureau	
Pumping Stations rehabilitated and constructed	number	0	0	0	1	1	1	1	Semi-annual	PIU – Xinxiang Urban and Rural	

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.

Project Objective Indicators (Xinxiang)

Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	
			2021	**2022**	**2023**	**2024**	**2025**				
										Construction Bureau	
Urban stormwater pipeline constrcuted	km	0	0	0	4	4	4	4	Semi-annual	PIU – Xinxiang Urban and Rural Construction Bureau	
Urban sewarge pipelines constrcuted	km	0	0	0	2	2	2	2	Semi-annual	PIU – Xinxiang Urban and Rural Construction Bureau	
National/Provincial highways rehabilitated	km	0	0	168	168	168	168	168	Semi-annual	PIU – Xinxiang Transport Bureau	
Highway bridges rehabilitated and constructed	number	0	0	10	10	10	10	10	Semi-annual	PIU – Xinxiang Transport Bureau	
Electrical Buses purchased	number	0	0	204	204	204	204	204	Semi-annual	PIU – Xinxiang Transport Bureau	
Rural Dikes rehabilitated and constructed	km	0	0	0	11.35	11.35	11.35	11.35	Semi-annual	PIU – Xinxiang Water Resources Bureau	The section of the Gong Canal.

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.

Project Objective Indicators (Xinxiang)

Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	
			2021	**2022**	**2023**	**2024**	**2025**				
Sedimentated rivers dredged (urban areas)	Km (and/or m^3)	0	0	0	13km / 1 million m^3	13km / 1 million m^3	13 km / 1 million m^3	13km/ 1 million m^3	Semi-annual	PIU – Xinxiang Urban and Rural Construction Bureau	
Sedimentated rivers dredged (rural areas)	Km	0	0	0	11.135 / 2.5 million m^3	11.135 / 2.5 million m^3	11.135 / 2.5 million m^3	11.135 / 2.5 million m^3	Semi-annual	PIU – Xinxiang Water Resources Bureau	The section of Gong Canal.

C. Results Monitoring Framework for Component 3 - Jiaozuo Post-disaster Recovery Program

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.

Project Objective Indicators (Jiaozuo)

Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	**Notes**
			2021	**2022**	**2023**	**2024**	**2025**				
Flood protection standards of the rivers under the project improved.	Number	0	0	0	2	4	4	4	Annual	PIU - Jiaozuo Water Rources Bureau	1. Dasha River, the section from starting poitn of the projectto South- to-North Water Transfer intersection will be improved to 20-year standard; the section from South- to-North Water Transfer intersection to Xiuwu County Boarder will be improved

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.

Project Objective Indicators (Jiaozuo)

Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	**Notes**
			2021	**2022**	**2023**	**2024**	**2025**				
											to prevent 50-year flood; the section in Xiuwu County will be improved to prevent 20-year flood. 2. Shanmen River, the section in Xiuwu County will be improved to prevent 20-year flood. 3. Manggai River in Mengzhou County will be improved to prevent 20-year flood. 4. New Mang River in Mengzhou County will be improved to prevent 20-year flood
Urban drainage systems under the project rehabilitated with improved urban drainage standards.	Number	0	0	0	1	1	2	2	Annual	PIU - Jiaozuo Housing and Urban Construction Bureau	
Flood emergency response system developed or improved	Number	0	0	0	1	1	1	1	Annual	PIU - Jiaozuo Emergency Bureau	Jiaozuo Emergency Bureau will lead and integrate the three emergency system modules, including the one for Wster Resources Bureau and the one for Housing and Urban Construction Bureau.

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.

Project Objective Indicators (Jiaozuo)

Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	**Notes**
			2021	**2022**	**2023**	**2024**	**2025**				
Jiaozuo Intermediate Results Indicators (these indicators will be further designed and will be disaggregated per municipalities)											
Urban Road Rehabilitated and constructed	km	0	1.2	5.9	11.8	20.9	23.7	23.7	Semi-annual	PIU - Jiaozuo Housing and Urban Construction Bureau	
Urban Dykes rehabilitated and constructed	km	0	3.4	11.6	19.8	28	36.2	36.2	Semi-annual	PIU - Jiaozuo Housing and Urban Construction Bureau	
Urban Bridges rehabilitated and constructed	number	0	2	8	14	14	14	14	Semi-annual	PIU - Jiaozuo Housing and Urban Construction Bureau	
Pumping Stations rehabilitated and constructed	number	0	0	2	2	2	2	2	Semi-annual	PIU - Jiaozuo Housing and Urban Construction Bureau	
Urban stormwater pipeline rehabilitated	km	0	0	8	18	25	31.7	31.7	Semi-annual	PIU - Jiaozuo Housing and Urban Construction	

Project Objectives:	To support the post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood disaster risk management and flood emergency response.

Project Objective Indicators (Jiaozuo)

Indicator Name	**Unit of measure**	**Baseline 2020**	**Cumulative Target Values**					**End Target**	**Frequency**	**Responsibility**	**Notes**
			2021	**2022**	**2023**	**2024**	**2025**				
										Bureau	
Urban sewarge pipelines rehabilitated	km	0	0	7	13	16	16	16	Semi-annual	PIU - Jiaozuo Housing and Urban Construction Bureau	
Rural Dikes rehabilitated and constructed	km	0	0	8	20	30	35	35	Semi-annual	PIU - Jiaozuo Water Rources BureauM	
Sedimentated rivers dredged (urban areas)	Km (and/or m^3)	0	2km / 2,000 m^3	5km / 40,000 m^3	8km / 60,000 m^3	12km / 120,000 m^3	18km / 170,000 m^3	18km / 170,000 m^3	Semi-annual	PIU - Jiaozuo Housing and Urban Construction Bureau	
Sedimentated rivers dredged (rural areas)		0	0	8km / 40,000 m^3	20km / 1 million m^3	30km / 2 million m^3	30km / 2 million m^3	30km / 2 million m^3	Semi-annual	PIU - Jiaozuo Water Rources BureauM	

Annex 2: Detailed Project Description

1. **Project Objectives.** The project objectives are to support post-disaster rehabilitation and recovery in the municipalities of Zhengzhou, Xinxiang, and Jiaozuo of Henan Province, and to strengthen the capacity of the three municipalities in integrated flood risk management and flood emergency response.

2. **Expected Results.** The proposed Project is expected to achieve the following results:

- Flood protection standards of the rivers under the project improved.
- Urban drainage systems under the project rehabilitated with improved urban drainage standards.
- Damaged urban public transport systems under the project recovered.
- Damaged rural roads under the project reconstructed.
- Flood emergency response systems of the three project municipalities developed or improved.

3. **Expected Beneficiaries.** The project will directly benefit a population of about 3.4 million in Zhengzhou Municipality, 2.3 million in Xinxiang Municipality, and 1.6 million in Jiaozuo Municipality by the end of project implementation period. In the long-term, the entire population of around 20 million in the three municipalities will benefit from the project as it will support the rehabilitation and reconstruction of the affected urban and rural infrastructure, recovery of public utilities and services, and improved protection from subsequent flood disasters, therefore, overall economic recovery.

4. **Component 1 - Zhengzhou Post-disaster Recovery Program (Cost USD811.2 million, AIIB loan USD600 million)**. This component will finance civil works and goods required for rehabilitation and reconstruction activities in in the water and flood management, urban and transport sectors in Zhengzhou municipality. in Zhengzhou municipality. The sub-projects are: (a) integrated Jinshui River management project, including riverbank protection, river dredging, reconstruction of riverside roads and bridges, improvement of drainage and sewerage systems, and riverside green spacing and river ecosystems, amongst others; (b) rehabilitation of rural roads and bridges, and (c) rehabilitation of the Ying River in Dengfeng City; (d) development of an integrated flood risk management system and strengthening the capacity for emergency response; and (e) project management support for capacity building in procurement, financial management, environmental and social (ES) management and other technical areas.

5. **Component 2 - Xinxiang Post-disaster Recovery Program (Cost USD311.4 million, AIIB loan USD200 million).** This component will support activities to recover damaged infrastructure in the three sectors in Xinxiang municipality. The subprojects consist of: (a) rehabilitation of rivers and canals including river dredging and dike strengthening; (b) rehabilitation of national and provincial highways, urban bus terminals and purchase of electrical buses; (c) rehabilitation and improvement of urban

drainage systems; (d) development of integrated flood emergency response system; and (e) project management support.

6. **Component 3 - Jiaozuo Post-disaster Recovery Program (Cost USD276.2 million, AIIB loan USD200 million).** This component will finance interventions to support the recovery of Jiaozuo municipality, including: (a) rehabilitation of rivers and canals including river dredging and dike strengthening; (b) rehabilitation and improvement of the urban canals, drainage and sewage systems, and roads; (c) development of an integrated flood emergency response system including a smart river management system and a smart urban water management system; and (d) project management support.

A. Project Activities

The table below presents the proposed the project components, sub-components and activities proposed by the government.

Components, sub-components and project activities

No.	PIU	Sub-component	Total cost (USD million)	AIIB Loan (USD million)	Sub-component Activities
Component 1 - Zhengzhou Post-disaster Recovery Program					
Z1	Zhengzhou Urban & Rural Construction Bureau	Integrated Jinshui River Management	474.7	317.6	This sub-project is to rehabilitate, treat and improve the Jinshui River. The sub-project activities include: (1) river rehabilitation works including riverbank protection, weirs, ecological water supplement, and sewerage system improvement and reconstruction; (2) ecological engineering including sewerage system improvement, ecological flow management, landscape optimization and improvement of the associated green space and public utilities; (3) reconstruction and optimization of riverside roads, bridges and drainage systems to increase flood conveyance capacity; and (4) rehabilitation and reconstruction urban bridges.
Z2		Smart Water and Emergency Response Management System for the urban rivers in Zhengzhou	6.9	6.0	• Development of a smart water and emergency response system for the urban rivers in Zhengzhou, including: (1) monitoring equipment for water level, discharge, water quality, and precipitation etc; (2) development of early warning sub-system, water quality management sus-system, and flood emergency management sub-system, as well as system maintenance applications etc; (3) database, hardware and application interface; and (4) commanding platform.
Z3	Zhengzhou Transport Bureau	Rehabilitation of Rural Roads and Bridges	296.2	251.7	• This sub-project is to recover and reconstruct rural roads and bridges in six counties/districts of Zhengzhou municipality, including associated flood and drainage systems, safety utilities.
Z4	Dengfeng Water Resources Bureau	Rehabilitation of the Ying River	30.4	21.7	• This sub-project is to rehabilitate flood-damaged dikes, riverbank protection, bridges, and dredge river sediments.
Z5	Zhengzhou PMO	Project management support	3.0	3.0	• Support project management of the PMO, including hiring professional consultants to help project preparation and implementation.

Subtotal Zhengzhou			**811.2**	**600.0**	
Component 2 - Xinxiang Post-disaster Recovery Program					
X1	Xinxiang Water Resources Bureau	Rehabilitation of Gong Canal	30.1	11.8	• This sub-project is to rehabilitate and improve a section of the Gong Canal. Sub-project activities include: (1) canal dredging, dike strengthening. (2) reconstruction or rehabilitation of interconnections between roads and the dikes, sluices, bridges, irrigation control works, dike management stations and installment of two sets of GPS equipment. (3) associated water and environmental protection works.
X2	Weihui Water Resources Bureau	Rehabilitation of Weihui Cang River Downstream	27.8	19.2	• This subproject is to rehabilitate, reconstruct the section of the Cang River in Weihui County, including: (1) river dredging, reconstruction and strengthening damaged dikes and slope protection; (2) construction of the flood protection works at intersection with the South-to-North Water Transfer Canal; and (3) reconstruction of polder dikes and bridges.
X3	Xinxiang Transport Bureau	Rehabilitation of national and provincial highways	112.1	66.0	• This subproject is to rehabilitate damaged sections of various national and provincial highways
X4		Rehabilitation of public transport infrastructures and purchase EV Buses	30.6	28.5	• Reconstruction of flood damaged bus terminal and the associated facilities, and purchase of new electric buses to replace the damaged buses.
X5	Xinxiang Housing & Urban Construction Bureau	Improvement of Urban Drainage Systems and Roads	52.7	34.9	• This sub-project is to rehabilitate and improve the drainage systems and urban roads in Xinxiang City, including: (1) construction of East Mengjiangnv River pumping station on the Xinyan Road; (2) construction of underground drainage system along the Xinyan Road; and (3) rehabilitation and construction of roads and the associated drainage systems in the Highspeed Railway District.
X6		Rehabilitation and Reconstruction of Wei River	46.6	30.2	• This subproject is to dredge and rehabilitate the urban section of the Wei River, including dike strengthening, bank protections, riverside landscape, and public facilities.
X7		Xinxiang Emergency Response Capacity Enhancement	9.9	7.8	• Development of an integrated flood risk and emergency response management system. • Procurement of emergency rescue equipment.
X8	Xinxiang PMO	Project management support	1.6	1.6	• Support project management of the PMO, including hiring professional consultants to help project preparation and implementation.
Subtotal Xinxiang			**311.4**	**200.0**	

Component 3 - Jiaozuo Post-disaster Recovery Program					
J1	Jiaozuo Water Resources Bureau	Rehabilitation of Dasha River - the Jiaozuo City Section	52.0	38.8	• This sub-project is to rehabilitate and strengthen the river dike, dredge sediments, reconstruct bridges of the urban section of the Dasha River.
J2		Development of a Smart Water Management System	3.6	3.1	• This sub-project is to develop an integrated flood risk management system for the major rural rivers.
J3	Xiuwu Water Resources Bureau	Rehabilitation of the Dasha River in Xiuwu County	22.0	17.4	• This sub-project is to rehabilitate and strengthen the river dike, dredge sediments, and reconstruct bridges, sluices, roads for the section of Dasha River in Xiuwu county.
J4		Rehabilitation of the Shanmen River	5.2	4.9	• This sub-project is to rehabilitate and strengthen the river dike, dredge sediments, and reconstruct roads for the section of the Shanmen River in Xiuwu County.
J5	Mengzhou Water Resources Bureau	Rehabilitation of the Manggai River	19.2	13.9	• This sub-project is to rehabilitate and strengthen the river dike, dredge sediments, and reconstruct bridges for the section of the Manggai River in Mengzhou county.
J6		Rehabilitation of the New Mang River	4.7	4.5	• This sub-project is to rehabilitate and strengthen the river dike, dredge sediments, and reconstruct bridges, sluices, roads of the section of New Mang River in Mengzhou county
J7	Jiaozuo Housing & Urban Construction Bureau.	Rehabilitation of Urban Canals and Roads in Jiaozuo	154.5	103.9	• This sub-project is to rehabilitate and improve various urban canals and roads in Jiaozuo City, including: (1) dike rehabilitation and strengthen, river dredging for the Wengjian River, the Qunying River, the Baimamen River, etc; (2) rehabilitation of urban roads and the associated drainage systems; and. (3) safety testing and rehabilitation for the damaged urban bridges.
J8		Jiaozuo Smart Urban Water Management System	4.6	4.0	• This sub-project is to develop an urban water management system including flood risk management and water quality management.
J9	Jiaozuo Emergency Bureau	Jiaozuo Emergency Response Platform	7.3	6.4	• This sub-project is to develop an integrated emergency system platform for monitoring, early-warning and response.
J10	Jiaozuo PMO	Project management support	3.1	3.1	• Support project management of the PMO, including hiring professional consultants to help project preparation and implementation.
Subtotal Jiaozuo			**276.2**	**200.0**	
Total			**1,399**	**1,000**	

B. Project locations

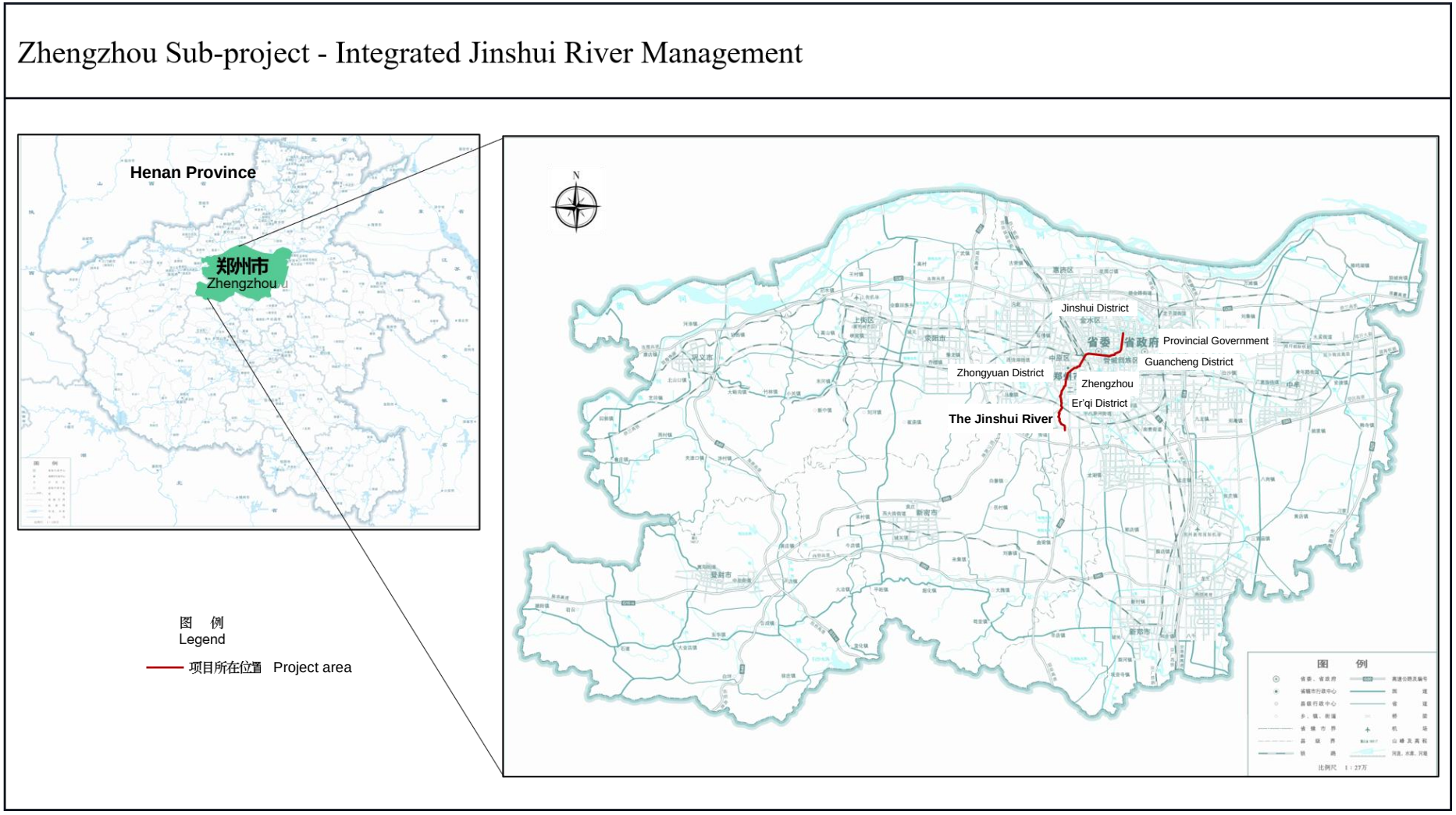


Figure A1. Location of Zhengzhou Urban Sector Project – Integrated Jinshui River Management.

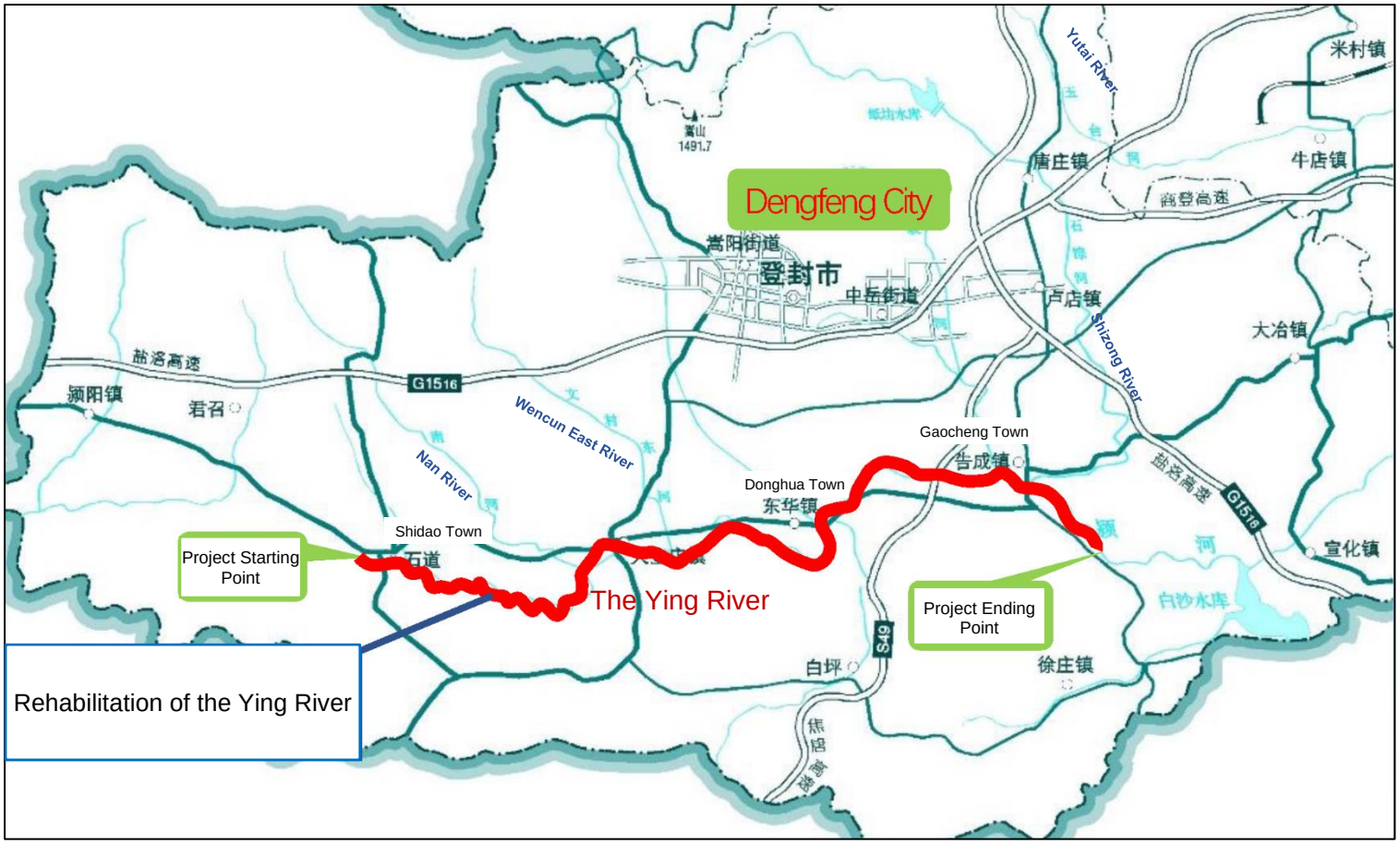


Figure A2. Location of Zhengzhou Water and Flood Management Sector - Rehabilitation of the Ying River

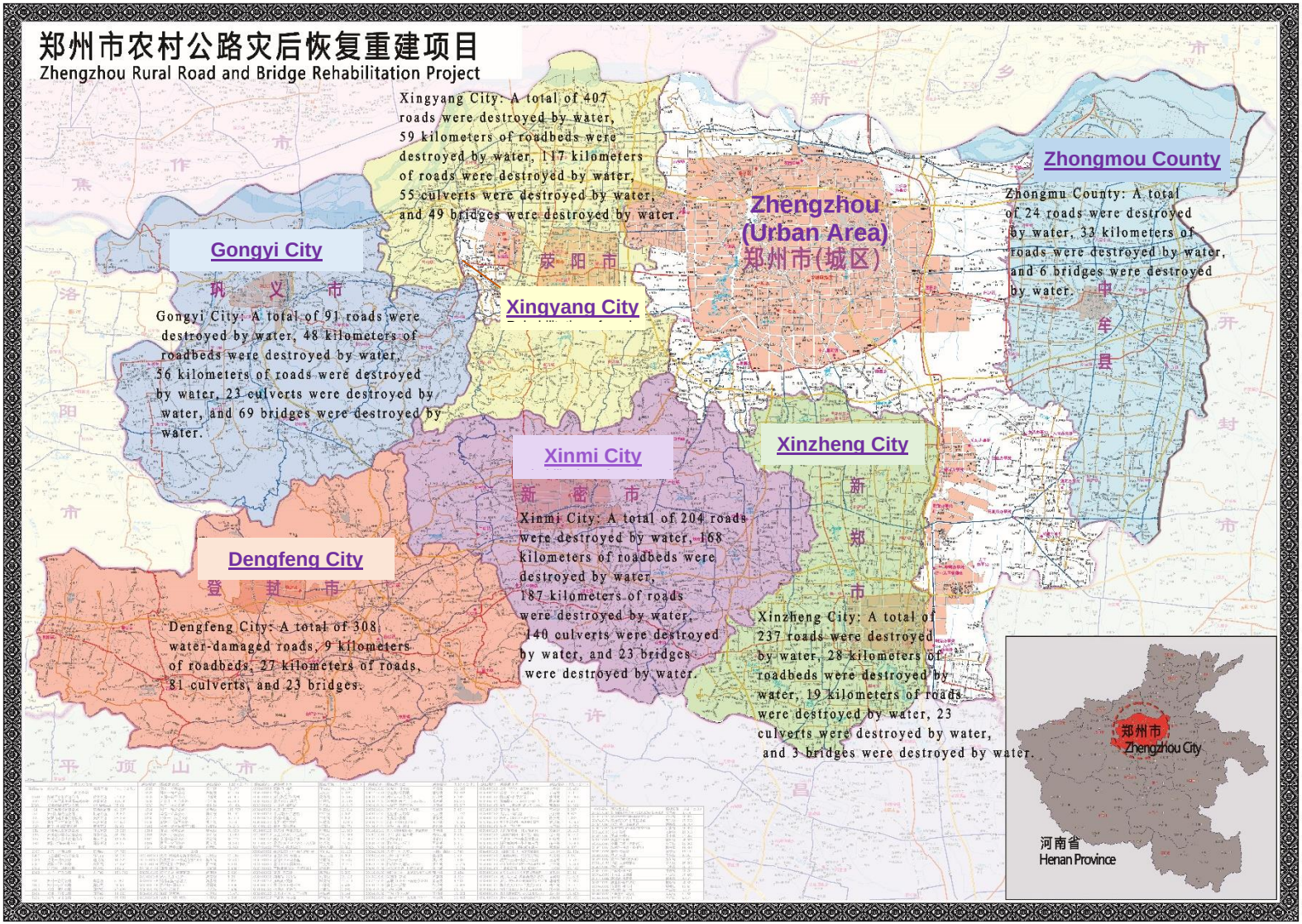


Figure A3. Location of Zhengzhou Transport Sector Project – Rehabilitation of rural roads.

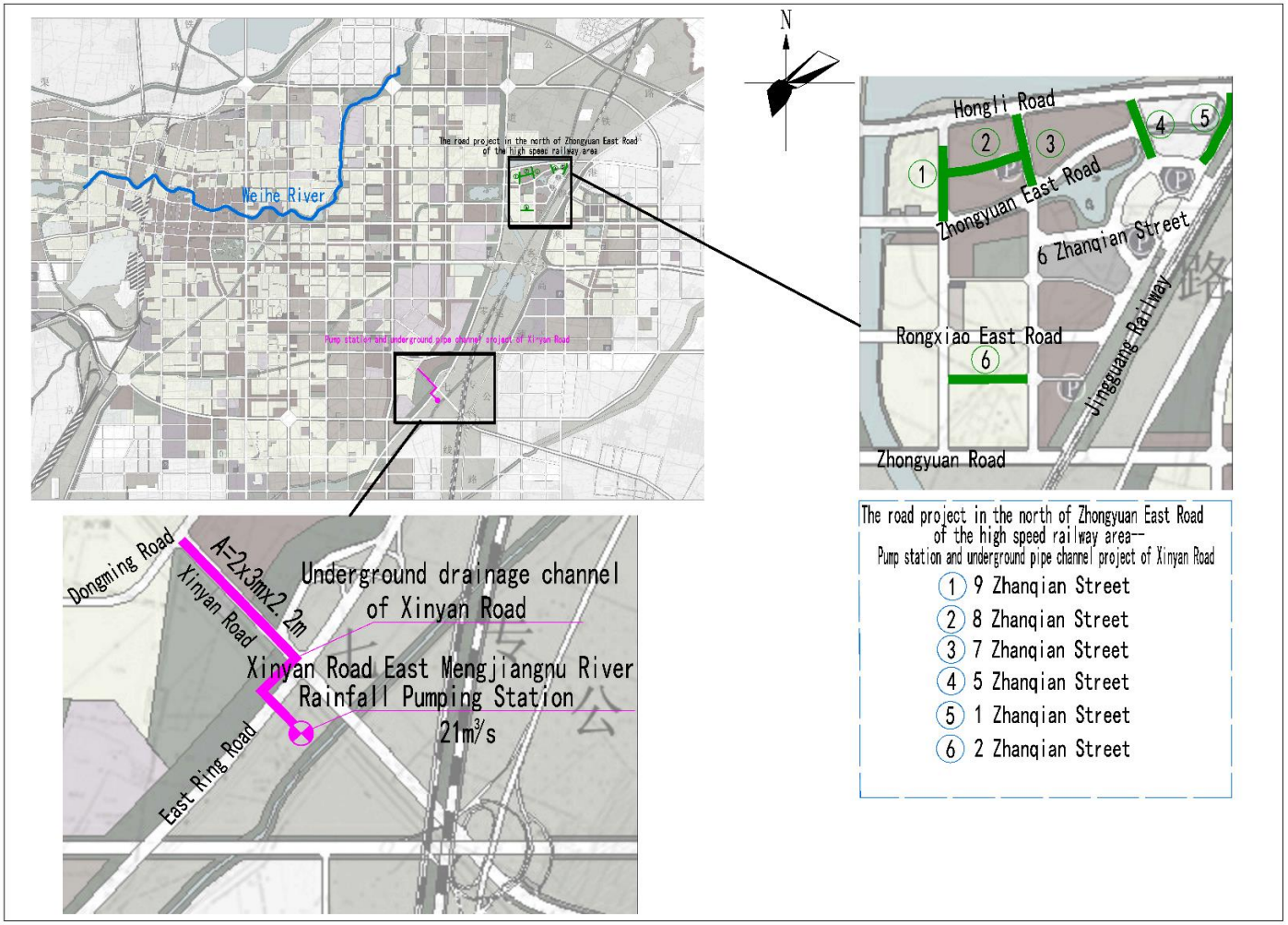


Figure A4. Location of Xinxiang Urban Sector Project – Improvement of urban drainage systems and roads.

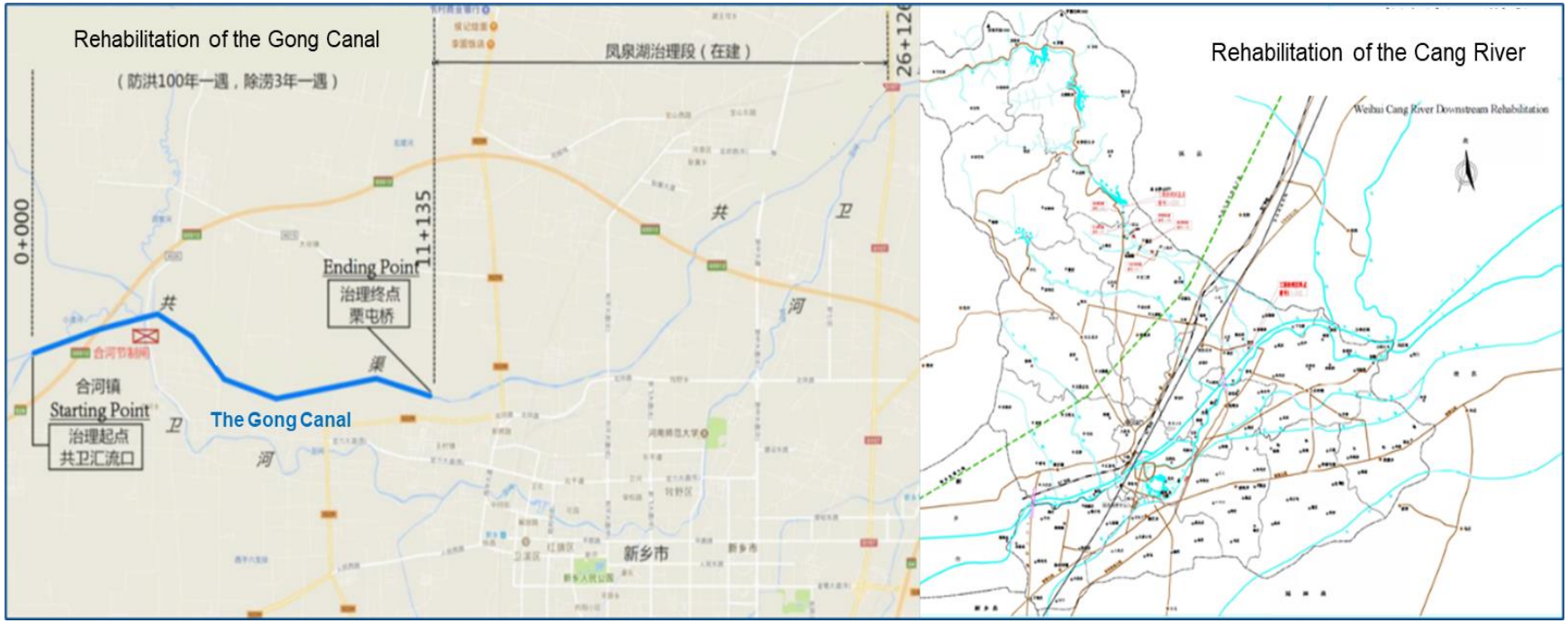
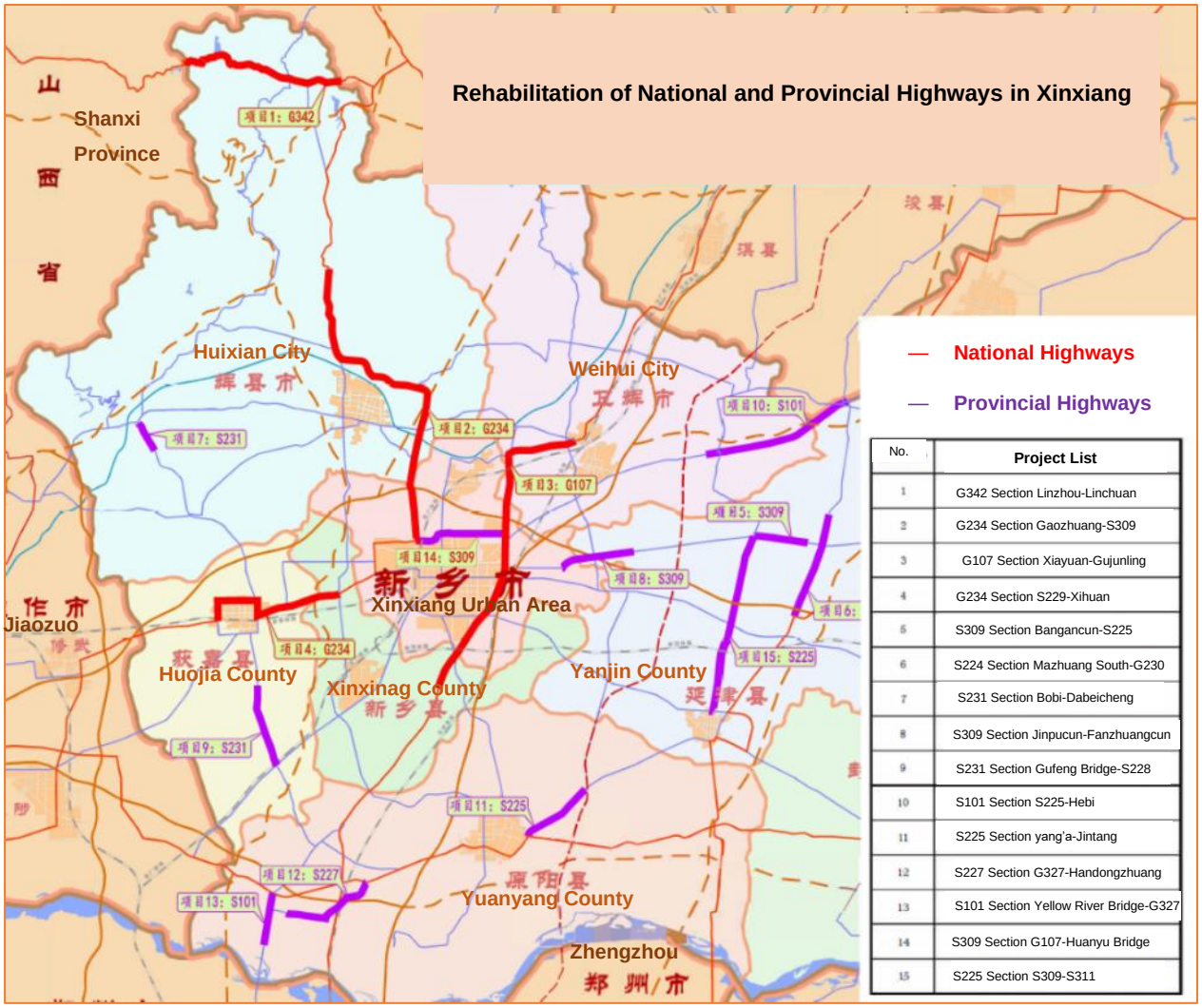


Figure A5. Location of Xinxiang Water Flood Management Sector Project – Rehabilitation of the Gong Canal and the Cang River.



No.	Project List
1	G342 Section Linzhou-Linchuan
2	G234 Section Gaozhuang-S309
3	G107 Section Xiayuan-Gujunling
4	G234 Section S229-Xihuan
5	S309 Section Bangancun-S225
6	S224 Section Mazhuang South-G230
7	S231 Section Bobi-Dabeicheng
8	S309 Section Jinpucun-Fanzhuangcun
9	S231 Section Gufeng Bridge-S228
10	S101 Section S225-Hebi
11	S225 Section yang'a-Jintang
12	S227 Section G327-Handongzhuang
13	S101 Section Yellow River Bridge-G327
14	S309 Section G107-Huanyu Bridge
15	S225 Section S309-S311

Figure A6. Location of Xinxiang Transport Sector Project – Rehabilitation of national and provincial Highways.

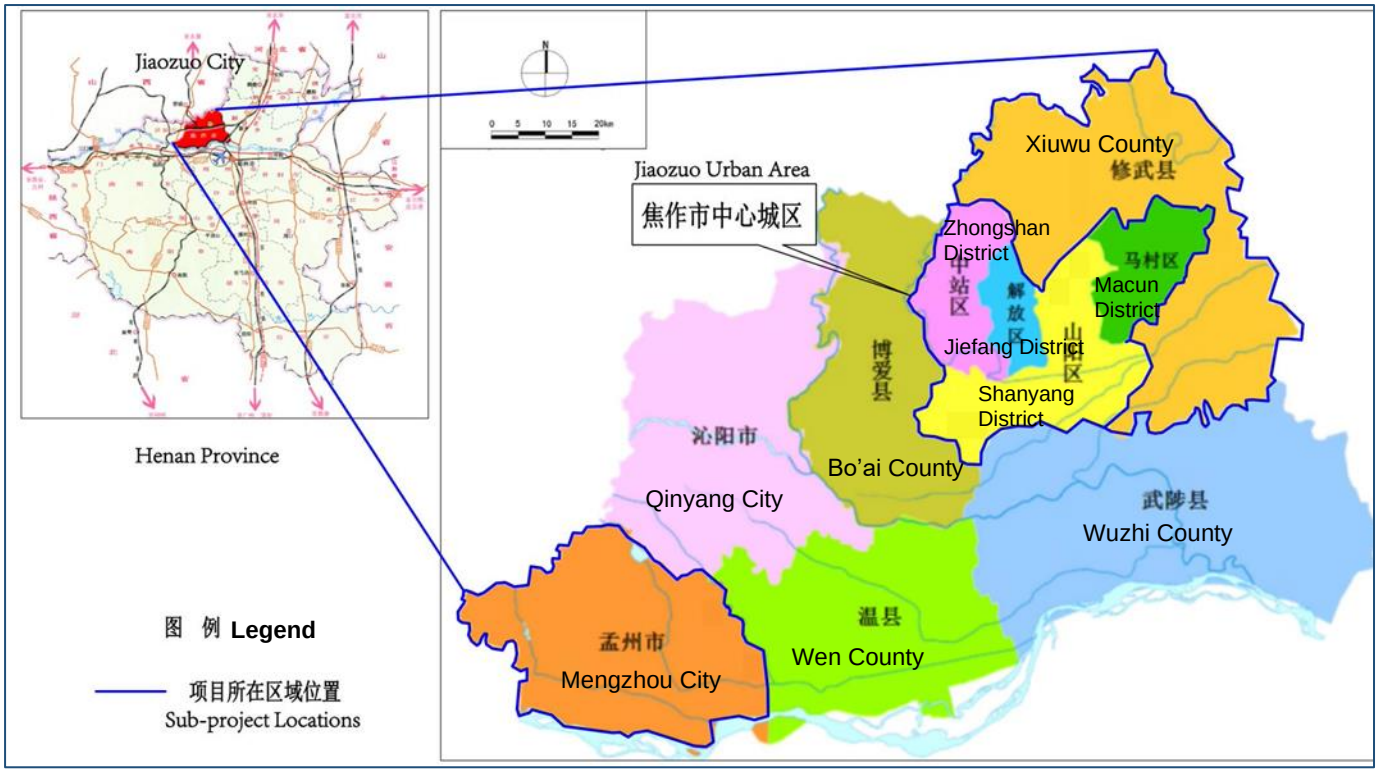


Figure A7. Location of Jiaozuo Urban Sector Project – Rehabilitation of urban canals and roads in Jiaozuo Municipality.

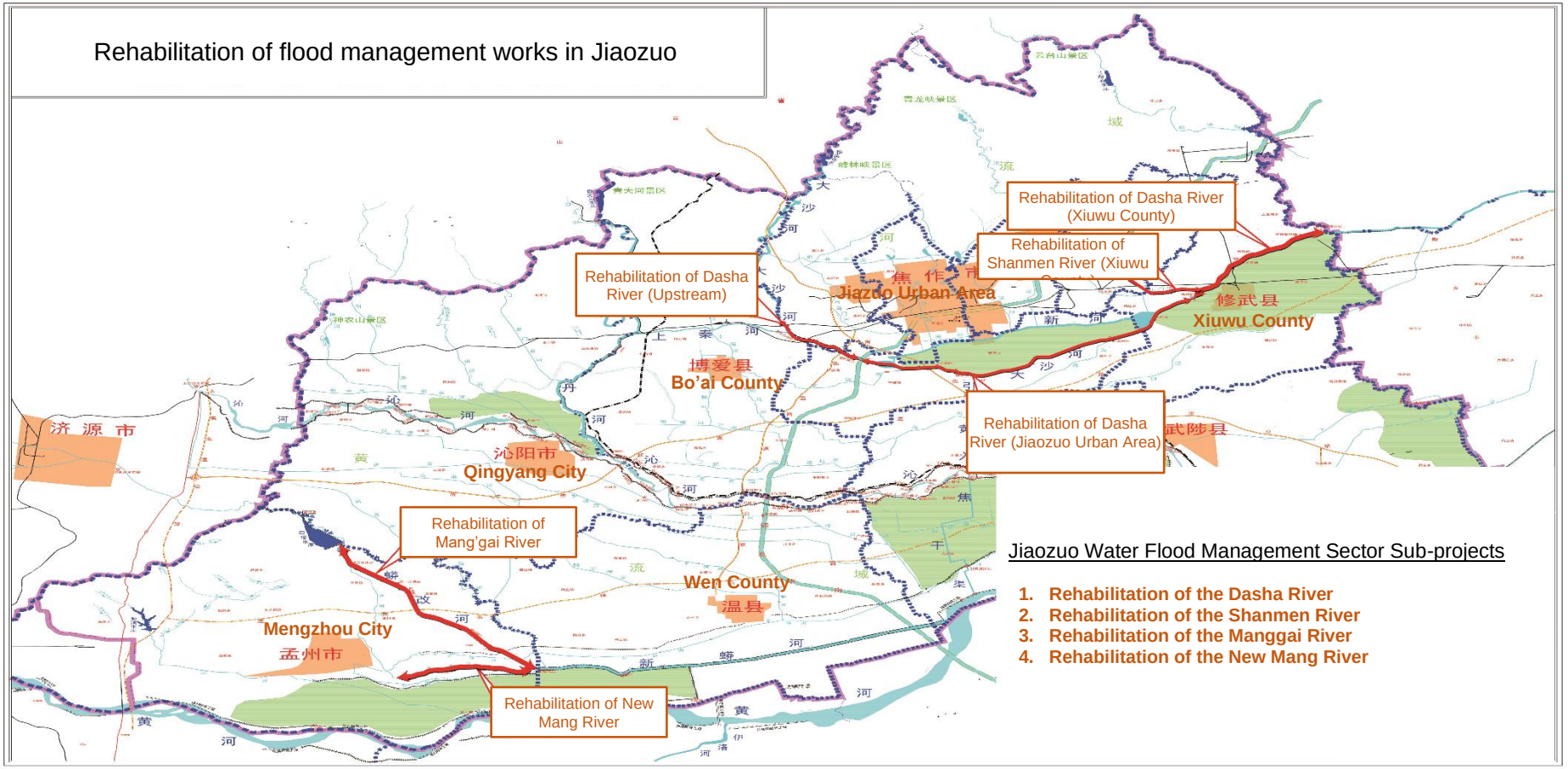


Figure A8. Location of Jiaozuo Water Flood Management Sector Project – Rehabilitation of the Dasha River, the Shanmeng River, the Manggai River, and the New Mang River.

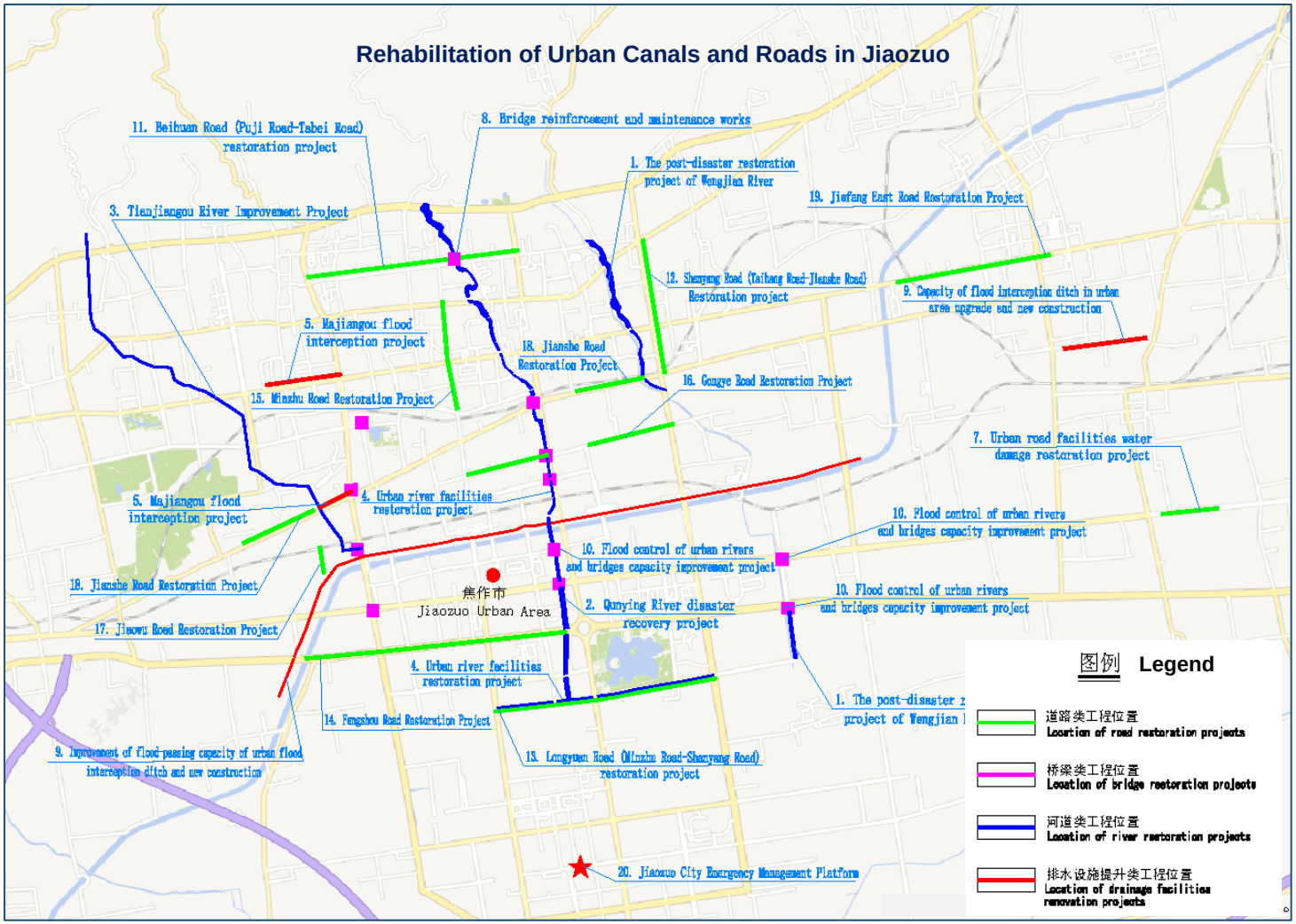


Figure A9. Location of Jiaozuo Urban Sector Project – Rehabilitation of urban canals and roads

Annex 3: Economic Background

1. **Henan's** GDP is ranked fifth among provinces of China with the value of USD796 billion in 2020. Over the past four decades, Henan's economy has enjoyed robust growth with an annual average of over 15 percent. However, more recently, the economic growth has been stabilized at around 9.4 percent (2015-2019). The adverse impacts of 2020 COVID-19 pandemic have slowed down of the economic growth of the province[10]. As a result, the GDP growth of Henan Province in 2019-2020 is around 1.3 percent.

2. Based on the available information from the government, the total direct economic loss due to the 7.20 flooding was estimated to be around USD17.5 billion, which is about 2 percent of the total Henan GDP. Zhengzhou, which suffers the highest value of damages and losses (USD8.25 billion) from the 7.20 flooding, is the main driver of the Henan's economy. Zhengzhou's GDP accounts for 21 percent of the total provincial GDP in 2020. The total GDP of all three cities, supported by the proposed project, is around 32 percent of the total provincial GDP. Manufacturing and services sectors are the leading economic sectors in the three cities accounting for 43 percent, 54 percent, respectively. The agricultural sector accounts for only 3 percent of the total GDP, the sector, however, is the largest employer capturing 35 percent of the total employment in Henan.

3. Based on preliminary data, the total number of the flood-affected population were more than 14 million people, while in the three municipalities the population affected by the flooding was over 5 million people, 29 percent of the total flood-affected population in the province. Xinxiang Municipality reported that the total flood-affected agricultural area was around 376,000 hectares, 80,000 hectare (21 percent) of which suffered totaled crop loss. The table blow shows some key economic statistics of Henan Provincial and the flood damages in the three municipalities.

Key economic statistics of Henan Province and the economic losses due to the 7.20 flooding

Municipality	Population 2020 (person)	Flood Affected Population (person)	Flood Affected Population to Total City Population (percent)	GDP 2019 (USD billion)	GDP 2020[P] (USD billion)	Municipality GDP to total Henan GDP (percent)	Direct Economic Losses due to 7.20 Flooding (USD billion)	Direct Economic Losses to Municipality GDP (percent)
Zhengzhou	12,600,574	1,783,209	14%	168	170	21%	8.25	4.85%
Xinxiang	5,814,300	2,637,128	45%	42	43	5%	6.53	15.29%
Jiaozuo	3,521,100	746,248	21%	40	40	5%	1.58	3.94%
Sub-Total	**21,935,974**	**5,166,585**	**24%**	250	**253**	**32%**	**16.36**	**6.47%**
Henan Total	109,519,500	14,216,256		785	796			2.06%

Note: [P] Projection by author based on data from the Henan Government. Data Sources: Statistical Yearbook 2021, Henan Government, 2021; The draft recovery and reconstruction master plan, and reports from the three municipalities.

[10] Bureau of Statistics of Henan Province and National Bureau of Statistics of China, 2021. Statistical Communiqué on the National Economic and Social Development of Henan Province in 2020; Government of Henan, 2021. Statistical Yearbook 2021.

4. The project costs will be mainly allocated to recovery and reconstruction of damaged/lost vital infrastructure in the following categories: flood and drainage management facilities in rural and urban areas, urban transport infrastructure, sewerage networks, highways, rural roads and bridges.

5. **Economic Benefits** As this proposed project is an emergency operation which aims to reinstate critical public infrastructure services to facilitate the restoration of economic activities and livelihoods of the affected population, a comprehensive economic and financial analysis was not feasible during project preparation, due to the fact that feasibility studies for the sub-projects haven't been prepared in time of emergency, limited data availability at the time of project preparation, and need to make the emergency support available as early as possible. Therefore, the economic analysis at the project preparation stage would only outline the expected project benefits and costs and describes the economic and social value and the benefits resulting from the rehabilitation and reconstruction of critical infrastructure and the improvement in flood resilience capabilities. More comprehensive economic analysis will be carried out in later stages on a sub-project basis, during the preparation of feasibility studies for the sub-projects. The main economic benefits of this project are: (a) restored economic activities and public infrastructure services; (b) avoided future costs of interruption on economic activities as well as damages, and losses to various sectors and/or stakeholders from future floods; (c) value of reduced scope and probability of property damages due to flooding as a result of enhanced flood protection and urban drainage standards, hence h improved climate resilience; (d) avoided future costs of emergency response, benefiting from increased capacity in flood emergency response management; (c) restored and enhanced ecosystem services value; and (d) appreciation of land value in urban areas.

6. Furthermore, additional temporary employment and other multiplier effects in the form of associated economic activities will be generated during the pre-construction and construction period. It is anticipated that the project benefits would far outweigh the project costs. Many of the project activities aim to quickly repair and rehabilitate the damaged infrastructure critical to social and economic services, which were existing prior to the 7.20 flooding, therefore the economic and social value of such sub-projects have been proven throughout their operation and services before the disaster. The project will support the improvement of flood protection standards in rural and urban areas, which will significantly reduce the future economic costs of reoccurring floods at various severity. The recent literature related to flood emergency operations of WB[11] and Asian Development Bank[12] suggests that estimated values of Economic Rate of Return (EIRR) for similar investment in flood protection and management system were in the range of 15 - 23 percent per year.

7. China has remarkably improved its flood risk management and flood resilience capacity since a few decades (see Annex 5), as well as Henan Province. As a result, the proportion of direct economic losses to GDP has been reduced from 1.9 percent in 1998 to

[11] The World Bank, 2017, Implementation Completion and Results Report for the Huai River Basin Flood Management and Drainage Improvement project.

[12] Asian Development Bank, 2012, Shaanxi Weinan Luyang Integrated Saline Land Management Project: Report and Recommendation of the President and Asian Development Bank, 2018, Chongqing Longxi River Basin Integrated Flood and Environmental Risk Management: Report and Recommendation of the President.

0.3 percent in 2016, although the absolute value of the direct economic losses due to flooding increased because of the development of the overall economy of the country. However, challenges remain. Particularly, in the time of climate change, flood risk could be expected to occur at higher frequency. Henan Province has a GDP of around USD800 billion in 2020 (see Annex 3), of which Zhengzhou municipality makes up 21 percent, Xinxiang 5 percent, and Jiaozuo 5 percent, respectively. Without adequate preparation for climate change and building climate resilience, the economy of the three municipalities, hence the province, will be at risk. Therefore, the economic value of the proposed project can be demonstrated as it will contribute to reducing the flood risk and the resulting economic loss due to climate change since climate adaption measures will be incorporated in the sub-project designs

8. In Xinxiang, one of the sub-projects will upgrade the public buses to electric bus operations which will generate the following economic benefits: reduction of operation and maintenance costs, reduced Greenhouse Gas (GHG) emissions and local pollutants such as sulfur oxide (SO_x), nitrogen oxide (NO_x) and fine particulate matters ($PM_{2.5}$). Similar project financed by Asian Development Bank in Guizhou, China[13] estimated the value of EIRR to be in the range of 12 – 17 percent per year. Additionally, temporary employment and associated economic activities will be generated during the pre-construction and construction periods. Importantly, climate change adaptation measures and integration of nature-based solutions that are part of the project activities will also provide additional benefits including improved water security, regulating urban heat island effect, improved air and water quality, GHG mitigation such as carbon sequestration from tree planting, enhanced urban biodiversity conservation, and natural habitat improvement. Property value will also likely improve as the flood risks are expected to decline. In sum, it is anticipated that the project benefits would far outweigh the project costs.

[13] Asian Development Bank, 2019, Guizhou Gui'an New District New Urbanization Smart Transport System Development Project: Report and Recommendation of the President.

Annex 4: Climate Financing

1. The proposed project is qualified as both climate mitigation finance and adaptation finance according to the Joint MDB methodology for climate finance tracking. As for climate mitigation finance, Electric Buses procurement in the rehabilitation public transport infrastructures system will qualify climate mitigation finance. Enhancing the system's adaptive capacity has been a key consideration in the program design, leading to at least 40% of AIIB's financing qualified as climate adaptation finance.

2. The three-step process as required by the joint MDB Methodology for Tracking Climate Change Adaptation Finance[14] is explained hereafter to provide further information: (i) setting out the climate change vulnerability context of the project; (ii) making an explicit statement of intent of the project to reduce climate change vulnerability; and (iii) articulating a clear and direct link between specific project activities and the project's objective to reduce vulnerability to climate change.

3. **Context of Vulnerability to Climate Change.** Due to the emergency nature of the proposed project, a downscale vulnerability assessment for the Henan province and the three municipalities was not carried out. However, the recent Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6)[15] as well the Blue Book on Climate Change prepared by the China Meteorological Administration[16] have provided evidence and science-based data and information that demonstrate a clear trend of increasing global warming as well as frequency and intensity of extreme weather events around the world and in China. The Blue Book shows that during 1951-2020, China has experienced a significant increase in annual mean land surface temperature (MLST) with an average increase of 0.26°C per decade, which is 30 – 73 percent higher than that of the global average of 0.15°C – 0.20°C. In 2020, China MLST was recorded at 1.3°C above the average MLST in the period of 1951-2020, the second highest since 1961. Figure A-1 depicts, the projections of the IPCC Sixth Assessment Report (AR6) under various global warming scenarios in Asia also confirm the trends of increasing average annual mean temperature for East Asia region.

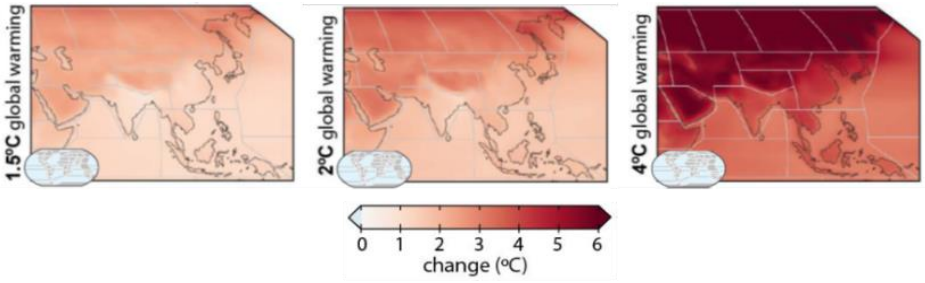


Figure A-1: Annual Mean Surface Temperature in Asia (Source: IPCC, 2021, AR6)

[14] European Bank for Reconstruction and Development, 2020. Joint Report of Multilateral Development Banks Climate Finance, 2021, Annex B. Joint Methodology for Tracking Climate Change Adaptation Finance.

[15] IPCC, 2021. Sixth Assessment Report Working Group 1 – The Physical Science Basis.

[16] China Meteorological Administration, 2021. China Blue Book on Climate Change 2021.

4. During 1961-2020, the average annual precipitation over China has shown an increasing trend with an average increase of 5.1 mm per decade. It is important to note that during this same period, China has observed a significant increase in number of extreme precipitation events. This has been greatly manifested by the 7.20 flooding. During July 17-24, 2021, in Henan province, the cumulative maximum point rainfall reached 1074 mm, 1.4 times more than the annual average rainfall of the province. The hourly maximum of 201.9 mm broke historical record of precipitation in the land territory of China. The extreme rainstorm event caused devastation to human lives, economy, livelihood, as well as farmlands, livestock, public and private assets and services. With high confidence, the AR6 also points out that daily precipitation extremes have increased over parts of Asia. Consequently, heavy precipitation will increase in frequency and intensity. Furthermore, this increasing trend in precipitation is likely to continue to intensify under different global warming scenarios as shown in Figure A-2. From 2035 – 2044, more than 55 million China's population could face an increased extreme river flood risk over a baseline figure of 24 million people[17], which is more than two-fold increase.

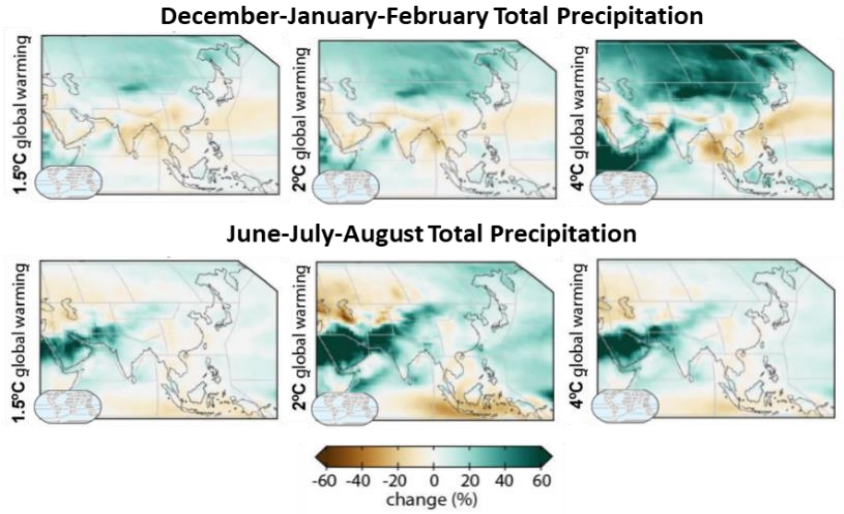


Figure A-2: Total Precipitation in Various Months in Asia (Source: IPCC, 2021, AR6)

5. Situated in central China, Henan Province spans over four largest river basins in China, the Yangtze River Basin, the Huaihe River Basin, the Yellow River Basin and the Haihe River Basin. With its unique geographical and hydro-climatic characteristics, Henan is one of the provinces most vulnerable to flood and drought risks in China. Of the 66 years from 1950 to 2015, flooding occurred in 32 years, with a less than 3-year recurrence interval, and in each of these years the flooded area in the province was greater than 667,000 hectares[18].

6. In summary, the recorded increased frequency and intensity of extreme weather events and higher degree of global warming due mainly to climate change over the last two decades have led to greater vulnerability to severe disasters with observable significant adverse social, environment, and economic impacts in China and Henan province. According

[17] Willner, S.N., Levermann, A., Zhao, F. and Frieler, K., 2018. Adaptation Required to Preserve Future High-End River Flood Risk at Present Levels, *Science Advances*, Vol. 4, No. 1. doi/10.1126/sciadv.aao1914.

[18] Department of Water Resources, Henan Province. Floods and Droughts. http://slt.henan.gov.cn/2019/12-28/1175074.html

to the Global Climate Risk Index 2021[19], China ranked first in the world in the average economic losses resulting from extreme weather events during 2000 – 2019.

7. **Contributing to Reduction of Climate Vulnerability in the Three Municipalities.** The proposed project supports strengthening of the resilience capacity of the three flood-affected municipalities by integrating climate resilient features into the reconstruction and rehabilitation of the damaged public infrastructure and strengthening the climate induced disaster risk management system including early warning system. Climate resilience and sustainability is one of the key project's selection criteria for sub-projects. The project ojective is also aligned with China Nationally Determined Contribution (NDC) on climate change adaptation i.e., "to improve safe operation of infrastructure of water conservancy, transport, and energy against climate change". The project activites in each of the project components are designed to enhance the resiliency of the infrastructure, including flood management infrastructure such as river courses and embankments, urban drainage systems, urban and rual roads and bridges, which will be reconstructed and/or rehabilitated with improved flood proection standards, and with due consideration of integrating with nature based solutions where possible. Aditionally, the project is supporting the development and implementation of an integrated emergency response system embracing climate risk management, disaster preparedness and disaster reduction.

8. In addition to financing the climate change adaptation activities, this proposed project also supports an upgrade of an urban public transport system to an electronic buses system which will generate the following economics, environmental, and health benefits: reduction of operation and maintenance costs, reduced GHG emissions and local pollutants such as sulfur oxide (SOx), nitrogen oxide (NOx) and fine particulate matters (PM2.5). Accoring to the Joint Methodology for Tracking Climate Change Mitigation Finance , this subproject also qualified as climate change mitigation finance under the sub-category 3.4 vehicle fleet energy efficiency and low carbon fuel and sub-category 7.4 infrastructure for low carbon and efficient transport.

[19] Germanwatch, 2021, Global Climate Risk Index 2021.

Annex 5: Member and Sector Context

1. **Flood Risk in China**. Due to its unique natural and geographical conditions and monsoon climate, two thirds of China's territory is under the threat of flooding with different flood origins and impact degrees. Flooding in China can be caused by rainstorms, snow-ice melting and river ice-jam, mountainous flash flood and debris flow, dam and dike breaks, storm surges, etc. Over the period of 2000 – 2018, annual average direct economic losses due to flooding accounted for 0.5% of the annual average national Gross Domestic Product (GDP) in this period[20].

2. **Development of Flood Risk Management Infrastructure.** Since 1949, China has been developing and improving its Flood Control Planning, while constructing flood management infrastructure accordingly. As of the end of 2020, more than 98,000 reservoirs and 306,000 km of dikes have been built in China, with 98 national flood storage and detention areas. These critical infrastructures have largely improved the flood control capacities of the major river basins in China and played key roles in protecting citizens and communities from catastrophic floods in the past decades.

3. **Laws and Regulations for Flood Risk Management.** A series of laws, policies, regulations and technical standards are in place for flood risk management. These include: (1) The "Water Law of the People's Republic of China" which was first enacted in 1988 and revised in 2002, 2009 and 2016 to provide provisions for flood risk management; (2) "Flood Control Law of the People's Republic of China" which came in force in 1998 and revised in 2009, 2015 and 2016; (3) Regulations and policies related to flood risk manager including the "Guidelines for the Safety and Construction of Flood Storage and Detention Areas" (1988), the "Regulations on River Management" (1988), and the "Regulations on Flood Prevention " (enacted in 1991 and revised in 2005), "Regulations on Reservoir and Dam Safety Management" (1991), among others; and (4) National Standards for Flood Prevention including GB50201-94 enacted 1995 and GB50201-2014 enacted in 2015.

4. **Flood Early Warning and Emergency Response.** China has strengthened the weather forecast capacities in medium and short-term, as well as the forecast for river flows and typhoon surges underpinned by the established nation-wide hydro-meteorological monitoring networks. Flood forecasting systems for main streams of the major rivers have been established, with extended forecast period and improved accuracy, to support better-informed decision-making with respect to flood early warning and emergency response. The National Flood Control and Drought Relief Headquarters is the national leadership in flood risk management and the Ministry of Water Resources, before 2018, was charged with day-to-day operations for flood management. Since 2018, the newly established Ministry of Emergency Management has taken over the responsibilities of flood emergency management.

5. **Standards for Urban Flood Prevention.** In China, the standards, for urban flood management, expressed in return period of the events, are set against various factors such

[20] Ministry of Water Resources, 2021. China Flood and Drought Disaster Prevention Bulletin - 2019.

as population and GDP index of the urban administrative areas (*e.g.,* municipality or city). The table below present the standards.

China Urban Flood Protection Standards[21]

Prevention Level	Permanent Residents （x1000）	Equivalent Economic Scale [22] （x1000）	Standards - Return Period (year)
I	≥1,500	≥3,000	≥200
II	≥500<1,500	≥1,000<3,000	100 - 200
III	≥200<500，	≥400<1,000，	50 - 100
IV	<200	<400	20 - 50

6. **Issues and Challenges.** Despite decades of effort and remarkable achievements, China still faces issues and challenges in flood risk management, including:

1) **Climate Change.** Climate change has led to the increase in occurrence and frequency of extreme weather and hydrological events. The 7.20 Flooding in Henan Province is an alarming example.

2) **Intensified conflicts between human and nature**. China has a population of 1.4 billion and the population pressure and rapid urbanization has intensified the conflicts between humans and nature. Increasingly reduced space for rivers and highly regulated water systems have resulted in reduction of flood discharging capacities of rivers and canals in both rural and urban areas, leading to prolonged flood duration and higher water levels, consequently, more severe flood disasters and impacts.

3) **Incomplete flood control and management system.** Although some specially protected sections of major rivers are equipped with the capacity to defend against large floods, the majority of small and medium-size rivers only have low flood protection standards, often less than 10-years return period of the standard. Inadequate operation and maintenance of flood management infrastructure such as dams and dikes adding to the weak performance of flood protection in some areas.

4) **Inadequate capabilities of flood forecasting, early warning and emergency response**, make small and medium-sized rivers especially vulnerable to flood, mountainous flash floods and debris flow. Casualties caused by mountainous

[21] Based on the National Standard for Flood Prevention GB50201-2014.

[22] Note: The equivalent economic scale is the product of GDP per capita index and population in the protected urban area. The GDP per capita index is the ratio of the GDP per capita in the protected urban area to the national GDP per capita in the same period.

flash flood account for more than 70% of the casualties caused by various flood disasters.

5) **Urban flooding is becoming more frequent and severe**. Rapid urbanization has changed the underlying surface conditions and changed hydrological regimes, making cities and urbanized areas more vulnerable to flooding and water logging. The number of cities in China has increased from 193 in 1978 to 684 in 2020. The urban population has increased from 77 million to 900 million, with an urbanization rate of over 63.9%. It is predicted that by 2050, the percentage of China's urban population will reach 76% of the total, higher than the average of 51% of that in middle-income countries. The rapid progress of urbanization has been the locomotive for China's economic development, in the meantime, it also brought huge challenges to urban flood risk management, emergency management and disaster reduction efforts. In addition, urban flood management has been lagging behind the overall urban development with issues such as the lack of integrated urban flood management planning, inconsistent flood and drainage standards. It has been observed that flood damages and socio-economic losses in urban areas have become increasingly severe.

Annex 6: Sovereign Credit Fact Sheet

A. Recent Economic Developments

1. China is an upper-middle-income country with income per capita of about USD10,400 and a population of about 1.4 billion, as of 2019.[23] China has weathered the COVID-19 pandemic remarkably well. In 2020, economic growth remained positive as the country contained the virus outbreak, implemented an effective stimulus and reopened the economy ahead of others, benefiting from a booming export demand as other regions were still mired in the pandemic-related lockdowns, while global consumers switched consumption from services to manufactured goods. In H1 2021, the economy grew by 12.7 percent, compared with H1 2020, due to the base effect but also reflecting the strong growth momentum[24].

2. Overall, China's economic growth has been trending down, declining from above 10 percent in 2010 to 6.0 percent in 2019.[25] This is related to the efforts to "rebalance" the economy more towards consumption, which are showing some early results. Before the pandemic, domestic consumption contributed 58 percent to the GDP growth, as of 2019.[26] However, in the aftermath of COVID-19, private consumption recovery has been lagging, which has led to concerns about sluggish household income growth and insufficient incentives to consume. Sector wise, services accounted for more than a half of 2020 GDP, whereas manufacturing accounted for about 38 percent.[27]

3. Inflation in 2020 was stable, at 2.4 percent. Expansionary fiscal policy to support the economy through the pandemic and a carryover from the 2019 tax reforms led to a deterioration of the fiscal balance to a 11.2 percent of GDP deficit (IMF's definition), while public debt increased to 44.7 percent of GDP[28].

Selected Economic Indicators 1/	2017	2018	2019	2020	2021*	2022*
GDP growth 2/ 7/	6.9	6.7	6.0	2.3	8.1	5.7
Inflation 2/	1.6	2.1	2.9	2.4	1.2	1.9
Current account balance 2/	1.6	0.2	1.0	2.0	1.6	1.3

[23] Income classification and data form the World Bank.

[24] The National Bureau of Statistics (NBS).

[25] See the table for figures. This applies to all other numbers in the document if the source is not specified.

[26] The National Bureau of Statistics (NBS).

[27] The National Bureau of Statistics.

[28] Fiscal balance as measured by net lending/borrowing using IMF's definition, which is based on official statistics, but broadens the fiscal coverage to include all four independent components of China's fiscal accounts, namely: general public budget, government funds, SOE budget, and social security (see IMF Country Report No. 2021/006, for more details). On the other hand, according to the narrower official budgetary approach (which includes only general public revenue and expenditure, adjusted for transfers) the deficit was 3.7 percent of GDP. Public debt measured by the general budgetary debt (official definition).

Fiscal balance 2/ 5/	-3.8	-4.7	-6.3	-11.2	-8.3	-8.7
Public debt 3/ 6/	36.2	36.5	38.1	44.7	47.2	49.5
External debt 3/	14.3	14.3	14.3	15.3	15.2	15.5
Gross official reserves (USD billions) 3/	3,236	3,168	3,223	3,579	3,842	4,127
Exchange rate (CNY/USD, end of period) 4/	6.53	6.86	6.98	6.52	6.38	..

Notes: * Projections unless specified otherwise; 1/ in percent of GDP; except growth rates which are in percentage changes, average year-on-year; or as indicated otherwise; 2/ Source is IMF World Economic Outlook April 2021; 3/ Source is IMF Country Report No. 2021/006; 4/ Source is State Administration of Foreign Exchange, for 2021: as of June 2, 2021; 5/ General budgetary balance (IMF definition), measured by net lending/borrowing; 2020-21 estimates and projections are from IMF WEO July 2021; 6/ General budgetary debt (official definition); 7/ Actuals for 2017-20 from National Bureau of Statistics database; 2021-22 projections are from IMF WEO July 2021.

4. The current account has been broadly stable. It increased to a surplus of 1 percent of GDP in 2019 due to a decline in imports and a reduction in the primary income deficit. In 2020, current account surplus is likely to have increased further, to around 2 percent of GDP, due to lower commodity prices, the collapse in outbound tourism expenditure, and a surge of demand for Chinese exports, including pandemic-related goods.

5. Foreign direct investment (FDI) into China reached record high levels in 2020, making China the biggest FDI destination in the world. Trade surplus combined with strong capital inflows led to a fast exchange rate appreciation. The Chinese currency Renminbi (RMB) has appreciated from around 7.0 in 2019 to below 6.4 per USD as of June 2021, which has raised some concerns among policymakers. International reserves have been broadly stable or growing. Reserves are estimated to cover about 16 months of imports, as of 2020, which is more than adequate.

B. Economic Outlook

6. According to IMF projections, China's GDP growth is expected to rebound to 8.1 percent in 2021. In the longer term, the GDP growth rate should continue the smooth and gradual downward trend, along the rebalancing policy. Meanwhile, the pandemic has also revealed risks in the economy, including lagging private consumption, rising financial vulnerabilities as debts have climbed up, and the still uncertain external environment.

7. Regarding external environment, there have been positive signs recently, including the signing of EU-China Comprehensive Agreement as well as the Regional Comprehensive Economic Partnership (ratification is pending). However, uncertainty remains about potential further escalation in trade and geo-political tensions that could lead to higher tariffs and supply chain disruptions. Continued technology decoupling could potentially add to risks.

8. On the domestic side, there are concerns about increasing financial stability risks related to rising vulnerabilities in the nonfinancial corporate sector (e.g., a significantly increase in debt), the highly leveraged property sector, the likely deterioration of credit quality in the banking sector and the delay of further progress on financial de-risking.

9. Risks to debt sustainability are relatively contained, as economic growth is robust while debt levels remain manageable. External debt is projected to remain stable in the medium term,

at around 15 percent of GDP. As the budget deficit is expected to remain higher than before the pandemic, public debt may continue increasing gradually, to almost 50 percent of GDP in the near term.

10. However, off-budget public investment activities are a source of risk. According to IMF's "augmented" debt definition—that is, including debt of local government financing vehicles likely to be recognized, which amount to almost 40 percent of GDP—public debt in 2020 increased from 80.5 to 91.7 percent of GDP, and is expected to rise further to over 110 percent of GDP in 2025.[29]

B. Still, China's sovereign credit remains strong, at A+/A1 with a stable outlook. This is due to the large and diversified economy, positive growth prospects, high degree of government's control over the financial sector (and the economy in general), as well as to debts being almost entirely in the local currency and refinanced at low costs. China's future debt profile will depend on continued economic growth, the implementation of fiscal consolidation measures and the gradual reduction of off-budget activities.

[29] See IMF Country Report No. 2021/006 for more discussion on the "augmented debt" and the related risks.