

SECTOR ASSESSMENT (SUMMARY): AGRICULTURAL, NATURAL RESOURCES, AND RURAL DEVELOPMENT¹

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. Located in the upper reach of the Yangtze River, mainly in the conservation zone of the Three Gorges Reservoir, Chongqing Municipality is the major economic hub of the Yangtze River Economic Belt (YREB) and plays a vital role in environmental and ecological conservation in the region. While Chongqing covers 3.8% of the surface area, it produces 7% (1.5 billion tons) of total household and 18% (355 million tons) of total industrial wastewater in the YREB annually. The economic growth is largely lagging in rural towns and villages in the municipality because of recurring flood disasters, deteriorating water pollution, and degrading ecological conditions. The Longxi River watershed in the municipality is a first-order tributary of the Yangtze River. It originates at Liangping District, traverses Dianjiang County and Changshou District, and finally flows into the Yangtze River. The river has a total length of 229.8 kilometers and a catchment area of 3,280 square kilometers (km²). The annual average rainfall in the basin is about 1,500 millimeters, 70% of which falls during June–August. The Longxi River has been heavily regulated with dams and reservoirs, including a large Changshou Reservoir (65 km²), which are the major sources of water. The fast-paced industrialization (50%) and urbanization (45%) rates along the Longxi River corridor, without proper land use planning, has put pressure on water resources.

2. **Fragile flood protection facilities.** The Longxi River watershed experienced six different fatal floods since 2007, with average annual economic damage of CNY1.7 billion. In Dianjiang County, the flood in 2010 caused CNY740 million in economic losses, damaged 413,200 *mu* of crops, and affected 458,000 people. During the same period, 86 floods were reported in Changshou District. In the district, the floods in 2014 caused CNY566.48 million in economic losses, damaged 60,300 *mu* of crops, and affected 106,000 residents.² In Liangping District, 10 fatal floods were documented, and the worst occurred in 2016. Only 10% of the river sections is protected by levees, designed for a 5–10-year return period of floods, and most of them are not well operated and maintained since local governments consider them a low investment priority.

3. **Inadequate management of wastes.** The water quality in Longxi River is lower than the third-tier national standards because of both point and nonpoint pollution. The existing wastewater treatment plants in the watershed are running at less than half their designed capacity because of the inadequate wastewater collection network. The watershed is home to 176 industries including liquor companies, paper industries, coal mining, and chemical industries, which discharge high effluent to the river.³ About 40% of the residents in the watershed do not have access to solid waste and wastewater services. Most domestic garbage is stored in the open air and moved to the river by runoff, polluting surface and ground water. The Longxi River corridors have more than 10 km² of active fish ponds, which discharge polluted water directly into the river.

4. Longxi River watershed has 1,336.97 hectares of farmland, which is 41% of the total watershed area. The use of chemical fertilizers and pesticides in agricultural production, and poor

¹ This summary is based on Asian Development Bank (ADB). 2018. *Technical Assistance to the People's Republic of China for Preparing Yangtze River Economic Belt Projects*. Consultant's draft final report. Manila (TA 9311-PRC). Available on request.

² A *mu* is a Chinese measurement (1 *mu* = 666.67 square meters).

³ Chongqing Municipal Government. *Program for Chongqing Longxi River Basin in Meeting Water Quality Standard, 2015–2017*. Chongqing.

farming and farm land management techniques, have caused leaching of pesticides and chemical fertilizers into the rivers and increased pollution. The nonpoint sources, mainly agriculture in the Longxi River watershed in 2013, were the largest contributor to total nitrogen (60% of the total measurements) and phosphate (40% of the total measurements) in the watershed.

5. **Water induced soil erosion.** Farmland with poor farming practices and barren land occupies most part of the watershed and is prone to a moderate to high degree of water-induced erosion. Most of these lands are found in the river corridors and hill slopes, causing direct sediment discharge into the river. Construction waste in urban areas has increased the sediment yield. Since 1990, about 60% of the wetlands and 35% of the vegetated areas in the watershed have disappeared and over 41% of the land area has been exposed to water-induced erosion.

6. **Climate change impact.** A regional study on climate change showed a slight increase (0.07 Celsius) in annual temperature in the Longxi River watershed during 1961–2010. Precipitation trend is slightly declining because of reduced rainfall in autumn. Severe storms do not show any obvious climate change trend, but the intensity increased from the 1960s to 1990s.

7. **Flood and environmental risk management.** The government's environmental treatment efforts have been fragmented and inadequate, and have not delivered the expected results. Several development plans at the basin and local levels have been developed, but their implementation overlooked the environment and flood risk situations. The nexus among flood, waste, and ecosystem management needs to be promoted, while enforcing a flood risk footprinting and accountability system with close coordination among upstream and downstream governments.⁴ Residents have long been exposed and vulnerable to floods, with a significant loss of lives and assets, but flood hazard and risk mapping have not yet been conducted; and local awareness, preparedness, and response capacities are low. Conventional approaches of risk mitigation are no longer sufficient, as new problems have emerged along with urbanization and climate change. These include flood plains encroachment, lake shrinkage, loss of natural wetlands, deterioration in water quality and aquatic habitats, and degeneration of river and lake functions, which have posed serious challenges to water security in the watershed.

8. **Opportunities.** The project provides an opportunity to maximize flood and environmental risk management (FERM) in the Longxi River watershed by adopting an integrated FERM approach. This uses a mix of structural and nonstructural measures, such as (i) a FERM plan for the watershed as a prerequisite for development, (ii) discontinued embankments along the rivers, with provisions for (a) flood protection in critical locations (urban areas) and flood retention in other spaces (barren or farm lands); (b) bio-shield to stop the leaching of nutrition, chemical substances, and sediment from farmlands; and (c) public recreation; (iii) flood preparedness measures, including emergency shelters with special provisions for vulnerable groups; (iv) mainstreaming of FERM into development to safeguard development and alleviate risks through better planning and design of the infrastructure; (v) conversion of fixed concrete dams to gated structures to ease water operation; (vi) wastewater collection networks; (vii) water diversion and retention measures, including reservoir operational guidelines to control flood peaks; and (viii) infrastructure operation and maintenance guidelines.

9. The project will also undertake FERM-related capacity development activities at different levels, particularly to (i) develop flood and water quality simulation models to aid FERM plans in

⁴ The nexus approach considers that flood, waste, and ecosystem management cannot be treated independently as they are inextricably intertwined under FERM. Under the flood footprinting and accountability system, all infrastructure development plans by governments will be validated for their impacts on flood risk in the river basin.

Longxi River watershed; (ii) upgrade hydro-meteorological and water quality monitoring services to provide decision support; (iii) pilot test a flash flood early warning system; (iv) promote community-based FERM; (v) strengthen the Longxi River coordination body in applying the river chief system;⁵ (vi) draft recommendations for land use planning and regulations; and (vii) promote the nexus approach of FERM and enforce the flood footprint and accountability mechanism under the river chief system, which is being implemented nationwide in the People's Republic of China (PRC). The project will directly benefit about 1 million inhabitants in 19 project towns in the project county and districts from FERM, particularly through strengthened flood control capacity, reduced pollutants into the rivers, and improved water quality.

10. **Risk.** The project area may exceed the population, urbanization, and industrialization forecasts and exert more pressure on water resources. Chongqing has been a government development priority with several new initiatives and development plans. Those existing and new development initiatives need to be harmonized and their cumulative impacts on Longxi River's health need to be reduced through proper coordination and implementation of the short-, medium-, and long-term FERM plans to be drafted under the project.

2. Government's Sector Strategy

11. **Water Law.** The Water Law of the People's Republic of China (revised edition) was passed during the 29th meeting of the Standing Committee of the Ninth National People's Congress and was implemented from 1 October 2002. It focuses on integrated water resources management in watershed scale; and stresses water saving, efficiency, and quality.

12. **River protection plan.** In 2001, the State Council issued the Three Gorges Reservoir Area and its Upper Water Pollution Control Plan, which covers Chongqing Municipality. In 2016, the State Council issued the Construction Plan of Comprehensive Management of Water Environment in Key River Basins including the Yangtze River Basin, which stated the requirement to improve the quality of water environment.

13. **National Thirteenth Five-Year Plan, 2016–2020.** The PRC's Thirteenth Five-Year Plan, 2016–2020 aims to build a harmonious and moderately prosperous society and to achieve more balanced economic development that considers environmental sustainability and social inclusiveness. Under the plan, the government targets 32 different priority themes, including the management of water resources. The plan also calls for (i) developing small and medium-sized cities as local economic centers, and (ii) addressing socioeconomic inequalities by alleviating poverty through targeted investments in urban and rural public services.⁶

14. **Water pollution action plan.** The overall objective of this plan, issued by the State Council in April 2015, is to promote the implementation of an ecological civilization (harmony between human and nature) and improve the water environment. The action plans (2030 and 2050) involve 10 different targets, including controlling pollutant emissions; conserving water resources; enforcing environmental law; strengthening water and environment management; defining and implementing the management responsibilities of all stakeholders; and strengthening public participation and social supervision.⁷

⁵ The heads of local governments are designated river chiefs to be accountable for FERM in their jurisdictions.

⁶ Government of the PRC. 2015. *Outline of the Thirteenth Five-Year Plan on National Economic and Social Development, 2016–2020*. Beijing.

⁷ State Council. 2015. *Water Pollution Action Plan*. Beijing.

15. **National flood management strategy.** After the heavy flood in the Yangtze River Basin in 1998, the government enacted a new flood control strategy (the 32 Words Strategy) focusing on embankment reinforcement, river dredging, ecological restoration by revegetation, flood control through dikes, and integrated flood risk management. Integrated flood risk management involves resources utilization; structural and nonstructural measures; coordination mechanism; land use; and emergency response.⁸

16. **Sector strategies of Chongqing Municipal Government.** The Thirteenth Five-Year Plan, 2016–2020 for Water Resource Development in Chongqing focuses on FERM. In 2016, the Chongqing Water Resources Bureau issued the Master Plan for Protection and Exploitation of Major River Banks in Chongqing for river protection. In August 2017, Chongqing Development and Reform Commission issued the Implementation Program for Longxi River Watershed Ecological Restoration and Management, targeting \$1.16 billion investment by 2025, which outlined the requirements for obeying ecological protection guidelines.⁹ In January 2018, the National Development and Reform Commission announced the first national priority river basin pilot projects and identified Longxi River Basin as one of 16 pilot river basins.

17. In 2018, the PRC has reformed its state institutions to make the administration better structured, more efficient, and service-oriented. This reallocated FERM mandates among different ministries to avoid duplication and promote an integrated approach to development.

18. **Poverty and social dimensions.** The beneficiaries of the project are the residents of 19 project villages who will largely benefit from the project through strengthened flood risk management and better environment and ecological protection in the Longxi River watershed. The project will benefit women, who constitute 48.7% of the direct beneficiary population. It will empower women and improve their income and quality of life. The community-based FERM component will empower community and their participation in decision-making.

3. ADB Sector Experience and Assistance Program

19. The Asian Development Bank (ADB) country partnership strategy for the PRC, 2016–2020 focuses on innovative projects where ADB can (i) catalyze the reduction of poverty, income inequality, and regional disparities; and (ii) promote an environmentally sustainable and less carbon-intensive economy.¹⁰ The strategy is closely aligned with the priorities of the PRC's Thirteenth Five-Year Plan, especially efforts to encourage greener and more inclusive development. Several ADB-financed projects in the PRC have similar elements to this project.¹¹ The main lessons learned relate to (i) an integrated approach and institutional coordination, (ii) community participation in the decision making, (iii) operation and maintenance of infrastructure, and (iv) safeguard measures implementation. These are used in the project design.

⁸ Opinions on Disaster Reconstruction, River and Lake Improvement and Construction of Hydraulic Works issued on 20 October 1998 by the State Council.

⁹ Chongqing Development and Reform Commission. 2017. *Implementation Plan for Longxi River Basin Ecological Treatment and Improvement Demonstration, 2017–2025*. Chongqing.

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

¹¹ ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for the Jiangxi Xinyu Kongmu River Watershed Flood Control and Environmental Improvement Project*. Manila; ADB. 2012. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for the Hubei Huangshi Urban Pollution Control and Environmental Management Project*. Manila; and ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for the Qingdao Water Resources and Wetland Protection Project*. Manila.

Problem Tree for Agriculture, Natural Resources and Rural Development

